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712

-001 thru -002

Power Plastic Surgery Table

MIDMARK®

Service and Parts Manual

Serial Number Prefixes:
DN

712 -001 thru -002

FOR USE BY MIDMARK TRAINED TECHNICIANS ONLY

SF-1329

Part No. 003-0698-00 Rev. I (1/01/04)

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IMPORTANT INSTRUCTIONS

General Safety Instructions

Safety First: The primary concern of Midmark Corporation is that this surgery table is maintained with the safety of the patient and staff in mind. To assure that services and repairs are completed safely and correctly, proceed as follows:

(1) Read this entire manual before performing any services or repairs on this surgery table.

(2) Be sure you understand the instructions contained in this manual before attempting to service or repair this surgery table.

Warnings

Throughout this manual are Note, Caution, and Danger paragraphs that call attention to particular procedures. These items are used as follows:

NOTE
A note is used to amplify an operating procedure, practice or condition.

CAUTION
A CAUTION is used for an operating procedure, practice, or condition which, if not correctly followed, could result in equipment damage.

DANGER
A DANGER is used for an operating procedure, practice, or condition which, if not correctly followed, could result in loss of life or serious personal injury.

Warranty Instructions

Refer to the Midmark "Limited Warranty" printed on the back cover of the Installation and Operation Manual for warranty information. Failure to follow the guidelines listed below will void the warranty and/or render the 712 Power Plastic Surgery Table unsafe for operation.

- In the event of a malfunction, do not attempt to operate the surgery table until necessary repairs have been made.
- Do not attempt to disassemble surgery table, replace malfunctioning or damaged components, or perform adjustments unless you are one of Midmark's authorized service technicians.
- Do not substitute parts of another manufacturer when replacing inoperative or damaged components. Use only Midmark replacement parts.

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SECTION I
GENERAL INFORMATION

1-1. Scope of Manual

This manual contains detailed troubleshooting, scheduled maintenance, maintenance, and service instructions for the 712 Power Plastic Surgery Table. This manual is intended to be used by Midmark's authorized service technicians.

1-2. How to Use Manual

A. Manual Use When Performing Scheduled Maintenance.

(1) Perform inspections and services listed in Scheduled Maintenance Chart (Refer to para 3-1).

(2) If a component is discovered to be faulty or out of adjustment, replace or adjust component in accordance with maintenance/service instructions (Refer to para 4-1).

B. Manual Use When Surgery Table Is Malfunctioning And Cause Is Unknown.

(1) Perform an operational test on surgery table (Refer to para 2-1).

(2) Perform troubleshooting procedures listed in Troubleshooting Guide (Refer to para 2-2).

(3) If a component is discovered to be faulty or out of adjustment, replace or adjust component in accordance with maintenance/service instructions (Refer to para 4-1).

C. Manual Use When Damaged Component Is Known.

(1) Replace or adjust component in accordance with maintenance/service instructions (Refer to para 4-1).

1-3. Description Of 712 Power Plastic Surgery Table

A. General Description (See Figure 1-1).

The 712 Power Plastic Surgery Table is a surgery table designed specifically for the plastic surgeon. It provides precise, powered, patient positioning and easy access to patient. The major serviceable components of the surgery table consist of a POWER ON / STANDBY switch, Emergency COMPUTER CONTROL OVERRIDE SWITCH, isolation transformer (export units only), pendant hand control, foot control assembly (optional), base actuator, base transducer, base capacitor, back actuator, back transducer, back capacitor, Trendelenburg actuator, Trendelenburg transducer, Trendelenburg capacitor, foot actuator, foot transducer, foot capacitor, lateral tilt motor and drive components, lateral tilt transducer, lateral tilt capacitor, lateral tilt limit switches, lateral tilt drive components, column assembly, leaf chains, gas spring, PC control board, casters, and an articulating headrest assembly (optional).

B. Theory of Operation (See Figures 5-1 and 5-2 for electrical schematic/wiring diagram and refer to Table 5-1 for audible signal guide chart).

Transducers

The five transducers, one for each axis, are monitored constantly by the PC control board. The voltage output of the transducer is directly proportional to the position of its axis. If the axis is at one extreme of its travel, the voltage output of the transducer will be approximately 0.5 volts. If the axis is at the other extreme of its travel, the voltage output of the transducer will be approximately 4.75 volts. If the axis is somewhere in between, the voltage output of the transducer will be directly linear to the position of the axis. This provides the PC control board a way of knowing the exact position of each axis at all times. The PC control board uses this information to keep the surgery table from colliding with itself and to return the table to a programmed position saved previously by the operator. Either the cable that is attached to the transducer or the transducer itself is attached to a stationary component (with respect to that axis). When the axis for that transducer is moved, the cable either pulls the transducer rod of the transducer outward or allows the spring in the transducer to pull the transducer rod into the transducer. The movement in the transducer rod causes the voltage output of the transducer to change.

Actuators

The capacitors provide motor start power to get the actuators running and motor run power to boost the power of the actuators.

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SECTION I
GENERAL INFORMATION

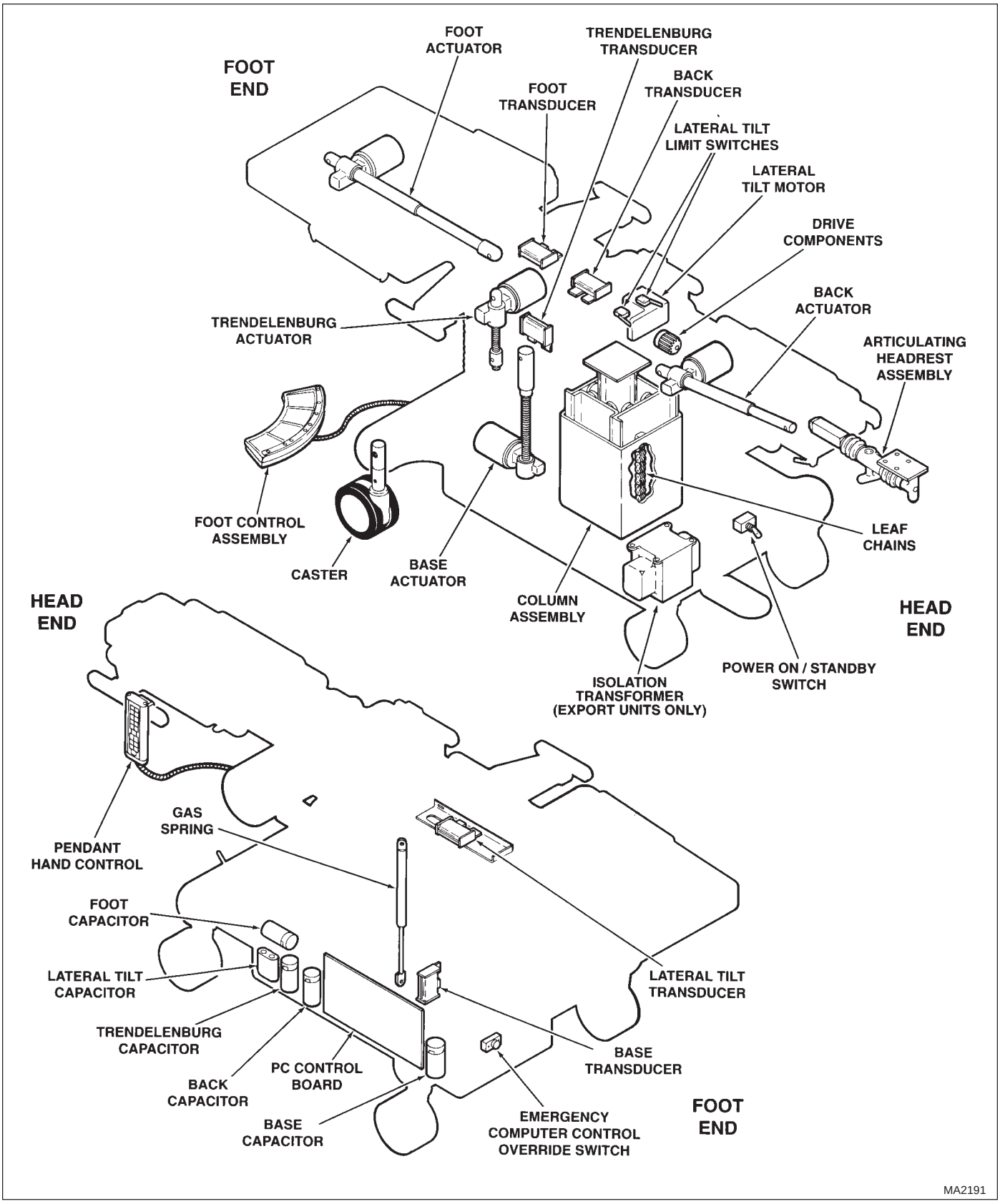

Figure 1-1. Major Components

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All the actuators, except for the lateral tilt motor, are ball screw driven. The actuators contain a pivot point on the end of the ball screw. If an axis is run to its end of stroke, the ball screw shaft spins inside the nut, which allows the actuator to run without damaging or advancing the nut. The PC control board senses no voltage change in the transducer, indicating no axis movement, and shuts off power to the actuator. The PC control board also sounds a one second fast beep to alert the operator that he/she is attempting to run one of the surgery tables' actuators past its limit.

The lateral tilt motor is connected to a direct drive unit. There is a left and a right limit switch to shut off power to the lateral tilt motor when the table has reached its extreme left or right travel. If the limit switches did not stop the motor, the drive unit would continue to attempt to turn, but would be physically stopped, possibly damaging or overheating the motor and drive unit.

All of the motors have a thermal overload switch which will activate if the actuator/motor is run continuously. The surgery table was not designed for continuous operation. The normal cool off period for the thermal overload switches is 10 - 20 minutes.

Column Operation (See Figure 5-3)

The column assembly employs two leaf chains and a gas spring to raise and lower the inner weldment which is attached to the table top.

The top leaf chain has one of its ends attached to the outer slide weldment (which is permanently stationary) and its other end attached to the inner slide weldment with a pulley located on the top of the middle slide weldment. When the base actuator raises the middle slide weldment, the pulley pushes up on the leaf chain which raises the inner slide weldment.

The bottom leaf chain has one of its ends attached to the outer slide weldment (which is permanently stationary) and its other end attached to the inner slide weldment with a pulley located on the bottom of the middle slide weldment. When the base actuator lowers the middle slide weldment, the pulley pushes down on the leaf chain which lowers the inner slide weldment.

A gas spring is attached to the inner slide weldment to provide extra lifting power to assist the base actuator in raising the table top.

Eccentric bearings and straight bearings are used to keep "sloppiness" and looseness out of the columns. The eccentric bearings keep high tension on the column walls at all times, maintaining a tight smooth glide pattern with no "sloppiness".

Powering Up The Unit

An input voltage of 115 VAC is supplied to the POWER ON / STANDBY SWITCH (on export units, an isolation transformer reduces input voltage from either 220 or 240 VAC to 115 VAC). When the POWER ON / STANDBY switch is on STANDBY, neither the hot nor neutral circuit is completed to the PC control board, providing total isolation of the surgery table's electrical circuits from the power source. When the POWER ON / STANDBY switch is switched to ON, both the hot and neutral circuits are completed, supplying current to the PC control board. The PC control board initializes itself, runs a diagnostic check, and checks the transducer voltages to determine the position of each axis.

Single Position Movement

When the ENABLE button is pressed, the PC control board unlocks the hand and/or foot control function(s). The table sounds a single beep to inform the operator of this and illuminates the green ENABLE lamp. If a single position button is pressed, the command is sent to the PC control board. The PC control board, which constantly monitors each axis for its exact position, determines if the axis can be moved without entering a crash position. If so, power is supplied to the actuator and the table top moves as desired. If the axis moves into a crash position, the PC control board, by monitoring the voltage level of that axis' transducer, senses this, cuts power to the axis actuator, and sounds a continuous chirping sound. If the axis has reached the end of its travel but the single position button continues to be pressed, the PC control board will sense that the voltage level of the transducer is not changing, indicating there is no movement of that axis. The PC control board shuts off power to that axis' actuator and sounds a fast beeping sound. Also, if a single position button is pressed, but the axis is moving at a slow rate of speed, the PC control board senses that the transducer voltage for that axis is not changing at the calculated rate. The PC control board shuts off power to that axis' actuator and sounds a fast beeping sound. The operator has five seconds from the time he/she completes his/her last selection to press a new selection. If this is not done in five seconds, the PC control board disables the pendant hand control and/or foot control and extinguishes the green ENABLE lamp.

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SECTION I
GENERAL INFORMATION

Programmed Position Movement

When the ENABLE button is pressed, the PC control board unlocks the hand and/or foot control function(s). The PC control board sounds a single beep to inform the operator of this and illuminates the green ENABLE lamp. If a programmed POSITION button is pressed, the command is sent to the PC control board. The PC control board supplies power to the appropriate axis' actuators simultaneously and monitors the transducers to determine the exact movement of each axis. When the axis have reached the desired position, the PC control board shuts off power to the actuators and sounds a single beep to inform the operator that the table has reached its programmed position. If the programmed POSITION button is malfunctioning or was not programmed with a position, the PC control board sounds a one second length fast chirping noise. The operator has five seconds from the time he/she completes his/her last selection to press a new selection. If this is not done in five seconds, the PC control board disables the pendant hand control and/or foot control and extinguishes the green ENABLE lamp.

Programming a Position Into Memory

The operator positions the table into a position he/she would like to store into memory. When the PROGRAM button is pressed and held for two seconds, the PC control board is ready to store the position in one of the eight POSITION buttons provided on the pendant hand control or four buttons provided on the optional foot control. The PC control board sounds a slow beep for approximately five seconds to indicate the table is in PROGRAM mode. After the PROGRAM button has been pressed, the operator has 10 seconds to select a POSITION button. After 10 seconds, PC control board will cancel the PROGRAM mode.

General Information

If there is a malfunction of the PC control board or one of the axis' transducers, pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH will allow single position functions to be selected. No enabling, collision avoidance, or programmed positioning will work.

If an error is found in the PC control board's diagnostic check, the table sounds a continuous tone. The table can be reset by turning the power to the table off for 20 seconds and then back on again. If tone persists, the PC control board is malfunctioning.

If the PC control board senses a transducer problem with one of the axis, the table sounds a one second interval slow beep during the operation of the other axis, assumes worst case scenario for collision control, and shuts off power to that axis.

If the facility's power supply drops below 95 Volts, the PC control board senses this and sounds a beep; one second on, four seconds off, and shuts off power to all axis.

There is a horizontal row of ten red L.E.D.'s on the PC control board. Each one represents one of the relays mounted on the PC control board. The relays provide the power to the actuators and lateral tilt motor. There are two relays per actuator or motor; one for each direction. When a command is pressed on the pendant hand control or foot control, the PC control board fires the proper relay. Its corresponding L.E.D. also illuminates. The L.E.D.'s provide a troubleshooting aid to determine if a fault is occurring on the PC control board or on other components. If the L.E.D. illuminates, it indicates that the PC control board is operating correctly as far as power output to the actuator.

There is a vertical set of five red L.E.D.'s. Each one represents one of the transducers. If a transducer is out of adjustment or malfunctioning, its L.E.D. will be illuminated. The L.E.D.'s provide a troubleshooting aid to help isolate which transducer is causing the fault.

There is one green L.E.D. on the PC control board labeled ENABLE. When ENABLE is pressed on the pendant hand control or foot control, the ENABLE L.E.D. on the PC control board will illuminate indicating that the command was received. The L.E.D. provides a troubleshooting aid to determine if the fault is in the PC control board or in the pendant hand control or foot control.

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1-4. SPECIFICATIONS

Factual data for the 712 Power Plastic Surgery Table is provided in Table 1-1.

Table 1-1. Specifications

Description	Data
Dimensions (overall):	
Length (Headrest in)	76.94 in (195.4 cm)
Length (Headrest out)	79.94 in (203 cm)
Width (depth)	28.5 in (72.4 cm)
Height (Adjustable)	24 in (61 cm) to 42 in (106.7 cm)
Weight:	
Without Shipping Carton	500 lb (227 kg)
With Shipping Carton	616 lb (279 kg)
Shipping Carton	27 in x 33.2 in x 73.7 in (68.6 cm x 84.3 cm x 187 cm)
Table Positioning	
Back	0° to 85°
Trendelenburg	0° to 20°
Reverse Trendelenburg	0° to -15°
Lateral Tilt (In either direction)	0° to 17°
Foot section	0° to -85°
Table Top Height (Adjustable)	24 in (61 cm) to 42 in (106.7 cm)
Weight Capacity (Normal Operation)	300 lb (136 kg)
Weight Capacity (Limited Operation)	400 lb (181 kg) Patient positioning is restricted. The patient must be positioned on the table top symmetrically and cannot exit from either end of the table top.
Axis Speeds (No load):	
Table Top Up	12 seconds
Back Up	9 seconds
Trendelenburg	12 seconds
Lateral Tilt	15 seconds
Foot Up	9.5 seconds
Pendant Hand Control	Standard Equipment
Foot Control	Optional Equipment
Enable Button	Allows movement if movement is initiated within 5 seconds of the ENABLE button being pressed.
Program Button	Allows a table top position to be stored in memory if a position button is pressed within 10 seconds of the PROGRAM button being pressed.
Electrical Requirements:	
115 VAC Unit	115 VAC, 60 HZ, 12 amp, single phase
230 VAC Unit	220/240 VAC, 50/60 HZ, 7 amp, single phase
Recommended Circuit: A separate (dedicated) circuit is recommended for this unit. The unit should not be connected into an electrical circuit with other appliances or equipment unless the circuit is rated for the additional load.	

1-5. Parts Replacement Ordering

If a part replacement is required, order the part directly from the factory as follows:

(1) Refer to Figure 1-2 to determine the location of the model number and serial number of the surgery table and record this data.

(2) Refer to the Parts List to determine the item numbers of the parts, part numbers of the parts, descriptions of the parts, and quantities of parts needed and record this data (Refer to para 6-1).

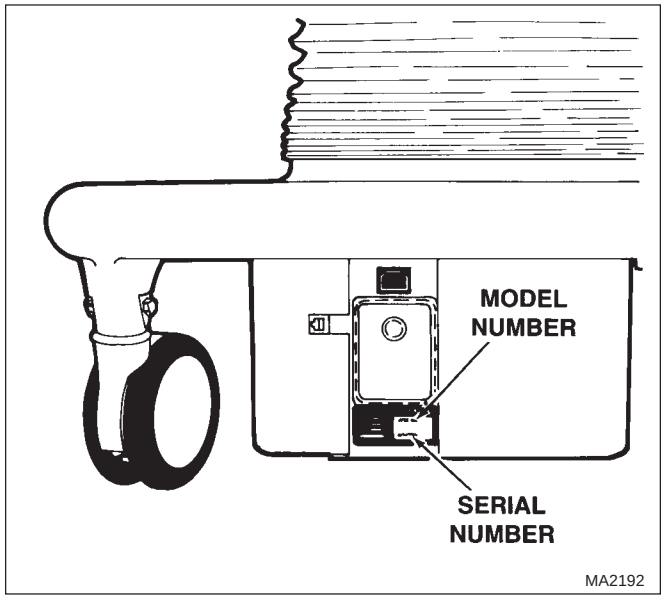

Figure 1-2. Model Number / Serial Number Location

NOTE
Ask the Purchasing Department of the company that owns the surgery table for this information. Otherwise, this information may be obtained from the dealer that sold the surgery table.

(3) Determine the installation date of the surgery table and record this data.

(4) Call Midmark with the recorded information and ask for the Medical Products Technical Service Department (See back cover of this manual for the phone number) or use the Fax Order Form (See page 7-2 for Fax Order Form).

1-6. Special Tools

Table 1-2 lists all of the special tools needed to repair the surgery table, how to obtain the special tools, and the purpose of each special tool.

Table 1-2. Special Tool List

Description of Special Tool	Manufacturer's Name / Address / Phone	Manufacturer's Part Number	Purpose of Special Tool
Multimeter	Commercially Available	Any Type	Used to check switches and connections for proper function by performing continuity and voltage checks. Also used to measure voltage so adjustments to the transducers can be made.
Offset Screwdriver (Ratchet or Manual)	Commercially Available	Any Type	Used to remove screws on the surgery table which are hard to access.
Amp Pin Extractor Tool - Smaller Diameter	AMP Inc. Harrisburg, PA 17105 (717) 564-0100	455822-2	Used to extract the smaller diameter pins from connectors on surgery table.
Amp Pin Extractor Tool - Larger Diameter	AMP Inc. Harrisburg, PA 17105 (717) 564-0100	458994-2	Used to extract the larger diameter pins from connectors on surgery table.
3/8" diameter steel rod x 10" length	Commercially Available	Any Type	Used to lock the column assembly in place so the base actuator can be removed.
Static Control Ground Wrist Straps	Commercially Available	Any Type	Used to prevent static discharge from degrading or damaging the logic components on the PC control board during its removal or installation.
1/4 " Ball Point Allen Wrench	Commercially Available	Any Type	Used on early models to remove an inside screw, which secures a lateral tilt block. The screw cannot be removed any other way.
5/16"-18 x 1-1/2" Bolt	Commercially Available	Any Type	Used to place tension on a particular slide of the column assembly so the eccentric bearings can be removed, installed, or adjusted.

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SECTION II
TESTING AND TROUBLESHOOTING

2-1. Operational Test

In order to effectively diagnose the malfunction of the surgery table, it may be necessary to perform an operational test as follows:

DANGER
Refer to the Operator Manual for complete instructions on operating the surgery table. Failure to do so could result in personal injury.

NOTE
The Operational Test, for the most part, only describes what should happen when the surgery table is operated. If the surgery table does something other than described, a problem has been discovered. Refer to the Troubleshooting Guide to determine the cause of the problem and its correction.

(1) Remove electrical cover (Refer to para 4-4).

(2) Plug the surgery table into a grounded, non-isolated, correctly polarized, 115 VAC, 15 ampere, three-pronged hospital grade receptacle.

(3) Switch the POWER ON / STANDBY switch to ON.

(4) Observe. The green ON lamp should illuminate. None of the five red transducer fail LED's on the PC control board should be illuminated; LATERAL FAIL LED- Lateral tilt transducer has failed, FOOT FAIL LED - Foot transducer has failed, TILT FAIL LED - Trendelenburg transducer has failed, BACK FAIL LED - Back transducer has failed, TABLE FAIL LED - Base transducer has failed.

(5) Press the ENABLE button on the pendant hand control.

(6) Observe. The PC control board should sound a single beep, the green ENABLE lamp should illuminate, and the green ENABLE LED on the PC control board should illuminate. If another function is not pressed within five seconds, the command functions should be disabled, and the green ENABLE lamp and the green ENABLE LED should extinguish.

(7) Press the ENABLE button on the pendant hand control.

NOTE
After the ENABLE button is pressed, the operator has five seconds to press a function button or the surgery table will automatically disable the command functions

Certain functions may be run into a collision situation. If this happens a continuous chirping sound will start and the function will stop moving. To get out of the collision situation, move the function which seems to be causing the collision situation and then try moving your original function again.

(8) Press the TABLE UP button on the pendant hand control until the actuator is shut off by the PC control board.

(9) Observe. The PC control board should *not* sound a fast beep (indicates slow or no motion of a function, a single function is at the end of its travel, or that a function will not start due to overload or malfunction), *except* when the actuator is at the end of its travel. Then a fast beep should sound to warn the operator that the actuator has reached the end of its travel.

(10) Repeat steps (6) thru (8) for the TABLE DOWN, BACK UP, BACK DOWN, TREND, REVERSE TREND, FOOT UP, FOOT DOWN, LATERAL TILT LEFT, and LATERAL TILT RIGHT buttons.

(11) Press the ENABLE button on the pendant hand control.

(12) Press and hold the PROGRAM button on the pendant hand control for two seconds.

(13) Observe. The PC control board should sound a one second interval beep.

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SECTION II
TESTING AND TROUBLESHOOTING

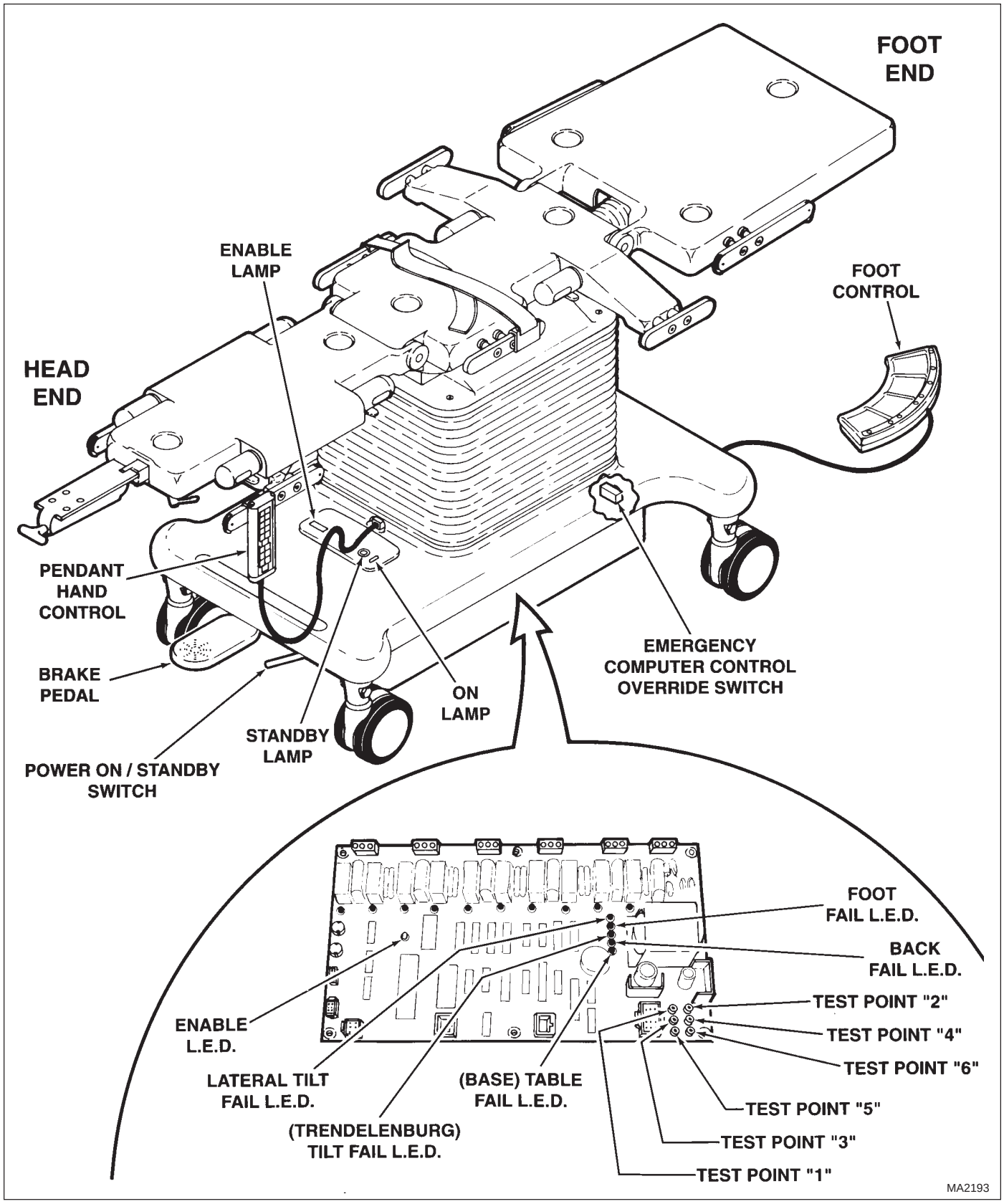

Figure 2-1. Operational Test

NOTE
If a POSITION button is not pressed within 10 seconds of pressing the PROGRAM button, the new position will not be stored in memory.

(14) Press the POSITION 1 button on the pendant hand control.

(15) Observe. The beeping will stop when a POSITION button is selected. If a position button is not selected within 10 seconds, the beeping will stop and the program mode will be disabled.

(16) Use any of the single function buttons to move the table top to a new position.

(17) Press the ENABLE button on the pendant hand control.

(18) Press and hold the POSITION 1 button on the pendant hand control until a single beep is sounded.

(19) Observe. The table top should move back to the position recorded in step (13). A single beep should sound indicating the position has been reached.

(20) Repeat steps (10) thru (18) for the remaining POSITION buttons on the pendant hand control; POSITION 2 thru POSITION 8.

NOTE
Remember, the foot control only has four POSITION buttons.

(21) If the surgery table has an optional foot control, repeat steps (3) thru (19) using the foot control.

(22) Press and hold the Emergency COMPUTER CONTROL OVERRIDE SWITCH while pressing all of the single functions and program functions on the pendant hand control one at a time.

(23) Observe. The green ENABLE LED on the PC control board should illuminate even though the ENABLE button was not pressed. All of the single control functions should be operable while the Emergency COMPUTER CONTROL OVERRIDE SWITCH is pressed, but the programmed functions should not be operable.

(24) Plug the positive probe of the multimeter to Test Point 5 and the negative probe to Test Point 6 on PC control board.

(25) Press and hold the Emergency COMPUTER CONTROL OVERRIDE SWITCH while pressing the TABLE DOWN button on the pendant hand control, until the base actuator reaches the end of its stroke.

NOTE
The foot section of the table top needs to be level or the collision control system will stop the base actuator from lowering all the way.

(26) Observe. The multimeter reading should be 0.5 - 1.0 VDC.

(27) Press and hold the Emergency COMPUTER CONTROL OVERRIDE SWITCH while pressing the TABLE UP button on the pendant hand control, until the base actuator reaches the end of its stroke.

(28) Observe. The multimeter reading should be 3.5 - 4.75 VDC. The range between the low and high voltages should be at least 2.5 VDC.

(29) Plug the positive probe of multimeter to Test Point 3 and the negative probe to Test Point 6 on PC control board.

(30) Press and hold the Emergency COMPUTER CONTROL OVERRIDE SWITCH while pressing the BACK UP button on the pendant hand control, until the back actuator reaches the end of its stroke.

(31) Observe. The multimeter reading should be 0.5 - 1.0 VDC.

(32) Press and hold the Emergency COMPUTER CONTROL OVERRIDE SWITCH while pressing the BACK DOWN button on the pendant hand control, until the back actuator reaches the end of its stroke.

(33) Observe. The multimeter reading should be 3.0 - 4.75 VDC. The range between the low and high voltages should be at least 2.5 VDC.

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(34) Plug the positive probe of multimeter to Test Point 1 and negative probe to Test Point 6 on PC control board.

NOTE
The foot section of the table top needs to be level and the table top needs to be raised or the collision control system will stop the trendelenburg actuator from lowering all the way.

(35) Press and hold the Emergency COMPUTER CONTROL OVERRIDE SWITCH while pressing the REVERSE TREND button on the pendant hand control, until the trendelenburg actuator reaches the end of its stroke.

(36) Observe. The multimeter reading should be 0.5 - 1.0 VDC.

(37) Press and hold the Emergency COMPUTER CONTROL OVERRIDE SWITCH while pressing the TREND button on the pendant hand control, until the trendelenburg actuator reaches the end of its stroke.

(38) Observe. The multimeter reading should be 3.0 - 4.75 VDC. The range between the low and high voltages should be at least 2.5 VDC.

(39) Plug the positive probe of multimeter to Test Point 2 and negative probe to Test Point 6 on PC control board.

NOTE
The table top needs to be leveled and raised or the collision control system will stop the foot actuator from lowering all the way.

(40) Press and hold the Emergency COMPUTER CONTROL OVERRIDE SWITCH while pressing the FOOT UP button on the pendant hand control, until the foot actuator reaches the end of its stroke.

(41) Observe. The multimeter reading should be 0.5 - 1.0 VDC.

(42) Press and hold the Emergency COMPUTER CONTROL OVERRIDE SWITCH while pressing the FOOT DOWN button on the pendant hand control, until the foot actuator reaches the end of its stroke.

(43) Observe. The multimeter reading should be 3.0 - 4.75 VDC. The range between the low and high voltages should be at least 2.5 VDC.

(44) Plug the positive probe of multimeter to Test Point 4 and negative probe to Test Point 6 on PC control board.

(45) Press and hold the Emergency COMPUTER CONTROL OVERRIDE SWITCH while pressing the LATERAL TILT LEFT button on the pendant hand control, until the lateral tilt limit switch is tripped.

(46) Observe. When the lateral tilt left limit switch is tripped, the lateral tilt motor should be shut down automatically. The multimeter reading should be 0.5 - 1.5 VDC.

(47) Press and hold the Emergency COMPUTER CONTROL OVERRIDE SWITCH while pressing the LATERAL TILT RIGHT button on the pendant hand control until the lateral tilt right limit switch is tripped.

(48) Observe. When the lateral tilt right limit switch is tripped, the lateral tilt motor should be shut down automatically. The multimeter reading should be 3.5 - 4.5 VDC. The range between the low and high voltages should be at least 2.5 VDC.

(49) After making any necessary adjustments or repairs, perform the calibration procedure on the surgery table (Refer to para 4-33).

(50) Switch the POWER ON / STANDBY switch to STANDBY.

(51) Observe. The STANDBY lamp should illuminate and a single beep should sound indicating power has been removed from PC control board of surgery table.

(52) Press the brake pedal down. Attempt to move the surgery table.

(53) Observe. The brake pedal should stay in the down position when placed there. The surgery table should not move at all when pushed.

2-2. Troubleshooting Procedures

Table 2-1 is a Troubleshooting Guide which is used to determine the cause of the malfunction.

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Table 2-1. Troubleshooting Guide

Problem	Symptom	Probable Cause	Check	Correction
Surgery table will not operate and seems powerless.	No actions can be initiated and the green POWER ON lamp will not illuminate.	Facility circuit breaker providing power to surgery table is tripped.	Check to see if facility circuit breaker is tripped.	If circuit breaker is tripped, determine what caused the circuit breaker to trip, correct the problem, and then reset/replace the circuit breaker.
		Cordset unplugged from the facility outlet or from connector receptacle on surgery table.	Check to see if both ends of the cordset are plugged in properly.	Plug in both ends of cordset properly.
		Wire connections loose.	Check all wiring connections from the cordset to POWER ON / STANDBY switch. Use multimeter to check for proper voltage levels.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Isolation transformer is malfunctioning (export units only).	Use multimeter to check for proper voltage output from isolation transformer.	Replace isolation transformer.
		POWER ON / STANDBY switch is malfunctioning.	Check for proper voltage on output side of POWER ON / STANDBY switch when switch is turned to ON or replace suspect switch with known working switch.	Replace POWER ON / STANDBY switch.
	No actions can be initiated and no indicator beeps are sounding, but the green POWER ON lamp is illuminated.	Wire connections loose.	Check all wiring connections from the POWER ON / STANDBY switch to the PC control board. Use multimeter to check for proper voltage levels.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		1/4 amp fuse on PC control board is blown.	Remove 1/4 amp fuse and perform continuity check on fuse. See Figure 2-2 for location of 1/4 amp fuse.	Replace 1/4 amp fuse.
		PC control board is malfunctioning/	Replace suspect PC control board with known working PC control board.	Replace PC control board.
		Hand control, foot control, or coil cord malfunctioning.	Replace suspect component with known working component.	Replace malfunctioning component.
Emergency actions cannot be initiated even though surgery table has power.	When the Emergency COMPUTER CONTROL OVERRIDE SWITCH is pressed, actions still cannot be initiated.	Emergency COMPUTER CONTROL OVERRIDE SWITCH is malfunctioning.	Replace suspect Emergency COMPUTER CONTROL OVERRIDE SWITCH with known working switch or use multimeter to perform continuity check on switch.	Replace Emergency COMPUTER CONTROL OVERRIDE SWITCH.
		Hand control, foot control, or coil cord malfunctioning.	Replace suspect component with known working component.	Replace malfunctioning component.
		Wire connections loose.	Check all wiring connections from PC control board to the Emergency COMPUTER CONTROL OVERRIDE SWITCH. Use multimeter to check for proper voltage levels.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		PC control board malfunctioning.	Replace suspect PC control board with known working PC control board.	Replace PC control board.

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Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
An actuator assembly continues to run even though it has reached the end of its stroke.	No audible alarm sounds and the actuator assembly continues to run even though it has reached the end of its stroke.	The Emergency COMPUTER CONTROL OVERRIDE SWITCH is stuck in the "ON" position.	Check to see if the Emergency COMPUTER CONTROL OVERRIDE SWITCH is stuck in the "ON" position.	Jiggle the Emergency COMPUTER CONTROL OVERRIDE SWITCH until it releases from the stuck position. If the switch will not release or gets stuck again when pressed, replace the Emergency COMPUTER CONTROL OVERRIDE SWITCH.
No actions can be initiated from pendant hand control.	Surgery table has power but no actions can be initiated.	Coil cord is not plugged into pendant hand control or receptacle on surgery table properly.	Check if coil cord is plugged in properly.	Plug coil cord into pendant hand control or receptacle on surgery table properly. Clean any dirty connections.
		Ribbon connector from hand control panel has become disconnected from the control interface board.	Check if ribbon connector is connected to control interface board properly.	Connect ribbon connector of hand control panel to control interface board.
		Coil cord receptacle on surgery table is malfunctioning.	Plug pendant hand control into the other receptacle and attempt to operate the surgery table. If works, receptacle was malfunctioning.	Replace receptacle.
		Coil cord receptacle (is part of control interface board) on pendant hand control is malfunctioning.	Replace suspect control interface board with known working control interface board.	Replace control interface board.
		Coil cord is malfunctioning.	Use a multimeter to perform a continuity check on the coil cord.	Replace coil cord.
		Pendant hand control is malfunctioning.	Replace suspect control interface board with known working interface board.	Replace control interface board.
			Replace suspect hand control panel with known working hand control panel.	Replace hand control panel.
No actions can be initiated from foot control.	Surgery table has power but no actions can be initiated.	Coil cord is not plugged into foot control or receptacle on surgery table properly.	Check if coil cord is plugged in properly.	Plug coil cord into foot control or receptacle on surgery table properly.
		Coil cord receptacle on surgery table is malfunctioning.	Plug foot control into the other receptacle and attempt to operate the surgery table. If it works, receptacle was malfunctioning.	Replace receptacle.
		Coil cord receptacle (is part of control interface board) on foot control is malfunctioning.	Replace suspect control interface board with known working control interface board.	Replace control interface board.
		Coil cord is malfunctioning.	Use a multimeter to perform a continuity check on the coil cord.	Replace coil cord.

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Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
One or more actions cannot be initiated with the hand or foot control.	Some actions may be initiated with the pendant hand control or foot control, but some may not.	Hand control panel of pendant hand control is malfunctioning.	Replace suspect hand control panel with known working hand control panel.	Replace hand control panel.
		A push-button switch on the foot control is malfunctioning.	Perform a continuity check on push-button switch or replace the suspect push-button switch with a known working switch.	Replace push-button switch.
		Wire connections loose in foot control.	Check all wiring connections from the push-button switches to the control interface board.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
When operating the surgery table in single function mode, the TABLE UP and TABLE DOWN functions will not work and the surgery table sounds warning beeps.	When operating the surgery table in single function mode, the surgery table sounds the following warning beep: A continuous fast beep (indicating slow or no motion of a function, a function is at the end of its travel, or a function will not start due to overload or malfunction).	Base transducer out of adjustment or cable/ turnbuckle assembly broken or loose.	Refer to Figure 2-2 to perform this check. Run the base actuator downward to the end of its stroke (The Emergency COMPUTER CONTROL OVERRIDE SWITCH must be pressed to do this). Check the output voltage of the base transducer with multimeter (Positive probe of multimeter into Test Point 5 and negative probe of multimeter into Test Point 6). Run the base actuator upward to the other end of its stroke. Check the output voltage of the base transducer with multimeter (Positive probe of multimeter to Test Point 5 and negative probe of multimeter to Test Point 6). The low voltage reading should be 0.5 VDC or greater and the high voltage reading should be 4.75 VDC or less. The range between the low and high voltages should be at least 2.5 VDC.	Adjust the base transducer. If the base transducer cannot be adjusted properly (If the turnbuckle runs out of threads), reposition transducer. If the base transducer still cannot be adjusted properly, replace or adjust cable/turnbuckle assembly.
		Base transducer malfunctioning.	Refer to Figure 2-2 to perform this check. Insert positive probe of multimeter into Test Point 5 and negative probe of multimeter into Test Point 6. While pressing Emergency COMPUTER CONTROL OVERRIDE SWITCH, move the surgery table up and down by pressing TABLE UP and TABLE DOWN. The voltage reading of Test Point 5 should stay in the normal 0.5 thru 4.75 VDC range and the voltage values should change steadily and evenly when the surgery table is	Replace base transducer.

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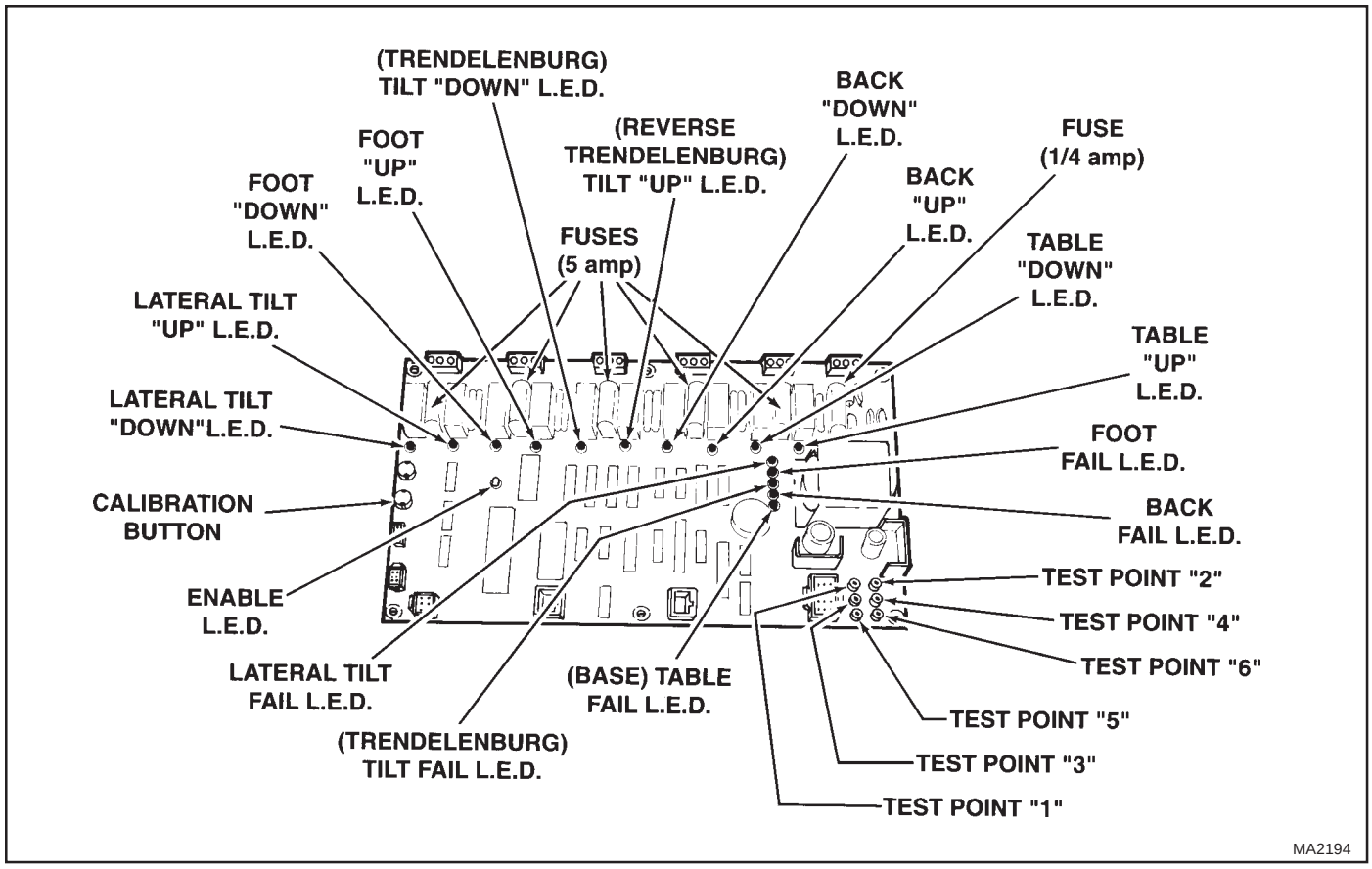

Figure 2-2. PC Control Board Test Points and Indicator L.E.D.'s For Use With The Troubleshooting Guide

Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
When operating the surgery table in single function mode, the TABLE UP and TABLE DOWN functions will not work and the surgery table sounds warning beeps. - Continued	When operating the surgery table in single function mode, the surgery table sounds the following warning beep: A continuous fast beep (indicating slow or no motion of a function, a function is at the end of its travel, or a function will not start due to overload or malfunction). - Continued	PC control board is malfunctioning or 5 amp fuse on PC control board is blown.	Refer to Figure 2-2 to perform this check. While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TABLE UP and TABLE DOWN buttons and observe the TABLE UP L.E.D. and the TABLE DOWN L.E.D. on the PC control board. If the L.E.D.'s illuminate when their button is pressed, the trouble is either the base transducer, base capacitor, base actuator, or loose wiring. If the L.E.D.'s do not illuminate when their button is pressed, the trouble is in the PC control board/5 amp fuse is blown.	Replace 5 amp fuse or PC control board.
			Replace suspect PC control board with known working PC control board.	Replace PC control board.
		Wiring connections loose.	Check all wiring connections from PC control board to base actuator, base capacitor, and base transducer.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.

Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
When operating the surgery table in single function mode, the TABLE UP and TABLE DOWN functions will not work and the surgery table sounds warning beeps. - Continued	When operating the surgery table in single function mode, the surgery table sounds the following warning beep: A continuous fast beep (indicating slow or no motion of a function, a function is at the end of its travel, or a function will not start due to overload or malfunction). - Continued	Base capacitor is weak or blown.	Replace suspect base capacitor with known working base capacitor.	Replace base capacitor.
		Thermal overload switch in base actuator is activated.	—	Wait 10 to 20 minutes to allow the base actuator to cool.
		Base actuator malfunctioning. (Actuator mechanism or motor assembly malfunctioning.)	Replace suspect base actuator with known working base actuator.	Replace or repair base actuator.
		Base actuator brake is malfunctioning allowing the table top to drift.	Replace suspect base actuator brake with known working brake.	Replace base actuator brake.
		Leaf chain tension out of adjustment or leaf chain is broken.	Check the tension of the leaf chains. Move the table top up and down. Does the table top hesitate slightly or jerk when moved upward on downward? If so, adjust leaf chain.	Adjust tension on leaf chain. Replace leaf chain if broken or worn.
		Gas spring weak or malfunctioning.	Check if gas spring is straining against its mounting screws. Replace suspect gas spring with known working gas spring.	Replace gas spring.
When operating the surgery table in single function mode, the BACK UP and BACK DOWN functions will not work and the surgery table sounds warning beeps.	When operating the surgery table in single function mode, the surgery table sounds the following warning beep: A continuous fast beep (indicating slow or no motion of a function, a single function is at the end of its travel, or a function will not start due to overload or malfunction).	Back transducer out of adjustment or cable/ turnbuckle assembly broken or loose.	Refer to Figure 2-2 to perform this check. Run the back actuator downward to the end of its stroke (The Emergency COMPUTER CONTROL OVERRIDE SWITCH must be pressed to do this). Check the output voltage of the back transducer with multimeter (Positive probe of multimeter into Test Point 3 and negative probe of multimeter into Test Point 6). Run the back actuator upward to the other end of its stroke. Check the output voltage of the back transducer with multimeter (Positive probe of multimeter to Test point 3 and negative probe of multimeter to Test Point 6). The low voltage reading should be 0.5 VDC or greater and the high voltage reading should be 4.75 VDC or less. The range between	Adjust the back transducer. If the back transducer cannot be adjusted properly (If the turnbuckle runs out of threads), reposition transducer. If the back transducer still cannot be adjusted properly, replace or adjust cable/turnbuckle assembly.

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Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
When operating the surgery table in single function mode, the BACK UP and BACK DOWN functions will not work and the surgery table sounds warning beeps. - Continued	When operating the surgery table in single function mode, the surgery table sounds the following warning beep: A continuous fast beep (indicating slow or no motion of a function, a single function is at the end of its travel, or a function will not start due to overload or malfunction). - Continued	Back transducer malfunctioning.	Refer to Figure 2-2 to perform this check. Insert positive probe of multimeter into Test Point 3 and negative probe of multimeter into Test Point 6. While pressing Emergency COMPUTER CONTROL OVERRIDE SWITCH, move the back of the surgery table up and down by pressing BACK UP and BACK DOWN. The voltage reading of Test Point 3 should stay in the normal 0.5 thru 4.75 VDC range and the voltage values should change steadily and evenly when the back of the surgery table is moved up and down.	Replace back transducer.
		PC control board is malfunctioning or 5 amp fuse on PC control board is blown	Refer to Figure 2-2 to perform this check. While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the BACK UP and BACK DOWN buttons and observe the BACK UP L.E.D. and the BACK DOWN L.E.D. on the PC control board. If the L.E.D.'s illuminate when their button is pressed, the trouble is either the back transducer, back capacitor, back actuator, or loose wiring. If the L.E.D.'s do not illuminate when their button is pressed, the trouble is in the PC control board/5 amp fuse is blown.	Replace 5 amp fuse or PC control board.
			Replace suspect PC control board with known working PC control board.	Replace PC control board.
		Wiring connections loose.	Check all wiring connections from PC control board to back actuator, back capacitor, and back transducer.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Back capacitor is weak or blown.	Replace suspect back capacitor with known working capacitor.	Replace back capacitor.
		Thermal overload switch in back actuator is activated.	—	Wait 10 to 20 minutes to allow the back actuator to cool.
		Back actuator malfunctioning. (Actuator mechanism or motor assembly malfunctioning.)	Replace suspect back actuator with known working back actuator.	Replace or repair back actuator.
		Back actuator brake is malfunctioning allowing the back section of the table	Replace suspect back actuator brake with known working brake.	Replace back actuator brake.

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Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
When operating the surgery table in single function mode, the TRENDelenburg and REVERSE TRENDelenburg functions will not work and the surgery table sounds warning beeps.	When operating surgery table in single function mode and the surgery table sounds the following warning beep: A continuous fast beep (indicating slow or no motion of a function, a single function is at the end of its travel, or that a function will not start due to overload or malfunction).	Trendelenburg transducer out of adjustment or cable/ turnbuckle assembly broken or loose.	Refer to Figure 2-2 to perform this check. Run the Trendelenburg actuator downward to the end of its stroke (The Emergency COMPUTER CONTROL OVERRIDE SWITCH must be pressed to do this). Check the output voltage of the trendelenburg transducer with multimeter (Positive probe of multimeter into Test Point 1 and negative probe of multimeter into Test Point 6). Run the trendelenburg actuator upward to the other end of its stroke. Check the output voltage of the trendelenburg transducer with multimeter (Positive probe of multimeter to Test Point 1 and negative probe of multimeter to Test Point 6). The low voltage reading should be 0.5 VDC or greater and the high voltage reading should be 4.75 VDC or less. The range between the low and high voltages should be at least 2.5 VDC.	Adjust the trendelenburg transducer. If the trendelenburg transducer cannot be adjusted properly (If the turnbuckle runs out of threads), reposition transducer. If the trendelenburg transducer still cannot be adjusted properly, replace or adjust cable/turnbuckle assembly.
		Trendelenburg transducer malfunctioning.	Refer to Figure 2-2 to perform this check. Insert positive probe of multimeter into Test Point 1 and negative probe of multimeter into Test Point 6. While pressing Emergency COMPUTER CONTROL OVERRIDE SWITCH, tilt the table top of the surgery table up and down by pressing TREND and REVERSE TREND. The voltage reading of Test Point 1 should stay in the normal 0.5 thru 4.75 VDC range and the voltage values should change steadily and evenly when the table top of the surgery table is tilted up and down.	Replace trendelenburg transducer.
		PC control board malfunctioning or 5 amp fuse on PC control board is blown.	Refer to Figure 2-2 to perform this check. While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TREND and REVERSE TREND buttons and observe the (Trendelenburg) TILT UP L.E.D. and the (Reverse Trendelenburg) TILT DOWN L.E.D. on the PC control board. If the L.E.D.'s illuminate when their button is pressed, the trouble is either the trendelenburg transducer, trendelenburg capacitor, trendelenburg actuator, or loose wiring. If the L.E.D.'s do not illuminate when their button is pressed, the trouble is in the PC control board/5 amp fuse is blown.	Replace 5 amp fuse or PC control board.
			Replace suspect PC control board with known working PC control board.	Replace PC control board.

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Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
When operating the surgery table in single function mode, the TRENDelenburg and REVERSE TRENDelenburg functions will not work and the surgery table sounds warning beeps. - Continued	When operating surgery table in single function mode and the surgery table sounds the following warning beep: A continuous fast beep (indicating slow or no motion of a function, a single function is at the end of its travel, or that a function will not start due to overload or malfunction). - Continued	Wiring connections loose.	Check all wiring connections from PC control board to trendelenburg actuator, trendelenburg capacitor, and trendelenburg transducer.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Trendelenburg capacitor is weak or blown.	Replace suspect trendelenburg capacitor with known working trendelenburg capacitor.	Replace trendelenburg capacitor.
		Thermal overload switch in Trendelenburg actuator is activated.	—	Wait 10 to 20 minutes to allow the Trendelenburg actuator to cool.
		Trendelenburg actuator malfunctioning. (Actuator mechanism or motor assembly malfunctioning.)	Replace suspect trendelenburg actuator with known working trendelenburg actuator.	Replace or repair trendelenburg actuator.
		Trendelenburg actuator brake is malfunctioning allowing the table top to drift.	Replace suspect trendelenburg actuator brake with known working brake.	Replace trendelenburg actuator brake.
When operating the surgery table in single function mode, the FOOT UP and FOOT DOWN functions will not work and the surgery table sounds warning beeps.	When operating the surgery table in single function mode, the surgery table sounds the following warning beep: A continuous fast beep (indicating slow or no motion of a function, a single function is at the end of its travel, or that a function will not start due to overload or malfunction).	Foot transducer out of adjustment or cable/ turnbuckle assembly broken or loose.	Refer to Figure 2-2 to perform this check. Run the foot actuator downward to the end of its stroke (The Emergency COMPUTER CONTROL OVERRIDE SWITCH must be pressed to do this). Check the output voltage of the foot transducer with multimeter (Positive probe of multimeter into Test Point 2 and negative probe of multimeter into Test Point 6). Run the foot actuator upward to the other end of its stroke. Check the output voltage of the foot transducer with multimeter (Positive probe of multimeter to Test Point 2 and negative probe of multimeter to Test Point 6). The low voltage reading should be 0.5 VDC or greater and the high voltage reading should be 4.75 VDC or less. The range between the low and high voltages should be	Adjust the foot transducer. If the foot transducer cannot be adjusted properly (If the turnbuckle runs out of threads), reposition transducer. If the foot transducer still cannot be adjusted properly, replace or adjust cable/turnbuckle assembly.

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Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
When operating the surgery table in single function mode, the FOOT UP and FOOT DOWN functions will not work and the surgery table sounds warning beeps. - Continued	When operating the surgery table in single function mode, the surgery table sounds the following warning beep: A continuous fast beep (indicating slow or no motion of a function, a single function is at the end of its travel, or that a function will not start due to overload or malfunction). - Continued	Foot transducer malfunctioning.	Refer to Figure 2-2 to perform this check. Insert positive probe of multimeter into Test Point 2 and negative probe of multimeter into Test Point 6. While pressing Emergency COMPUTER CONTROL OVERRIDE SWITCH, move the foot section of the table top up and down by pressing FOOT UP and FOOT DOWN. The voltage reading of Test Point 2 should stay in the normal 0.5 thru 4.75 VDC range and the voltage values should change steadily and evenly when the foot section of the table top is moved up and down.	Replace foot transducer.
		PC control board is malfunctioning or 5 amp fuse is blown.	Refer to Figure 2-2 to perform this check. While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the FOOT UP and FOOT DOWN buttons and observe the FOOT UP L.E.D. and the FOOT DOWN L.E.D. on the PC control board. If the L.E.D.'s illuminate when their button is pressed, the trouble is either the foot transducer, foot capacitor, foot actuator, or loose wiring. If the L.E.D.'s do not illuminate when their button is pressed, the trouble is in the PC control board/5 amp fuse is blown.	Replace 5 amp fuse or PC control board.
			Replace suspect PC control board with known working PC control board.	Replace PC control board.
		Wiring connections loose.	Check all wiring connections from PC control board to the foot actuator, foot capacitor, and foot transducer.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Foot capacitor is weak or blown.	Replace suspect foot capacitor with known working foot capacitor.	Replace foot capacitor.
		Thermal overload switch in foot actuator is activated.	—	Wait 10 to 20 minutes to allow the foot actuator to cool.
		Foot actuator malfunctioning. (Actuator mechanism or motor assembly malfunction.)	Replace suspect foot actuator with known working foot actuator.	Replace or repair foot actuator.
		Foot actuator brake is malfunctioning allowing the foot section of the table top to drift.	Replace suspect foot actuator brake with known working brake.	Replace foot actuator brake.

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Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
When operating the surgery table in single function mode, the LATERAL TILT LEFT and LATERAL TILT RIGHT functions will not work and the surgery table sounds warning beeps.	When operating surgery table in single function mode and the surgery table sounds the following warning beep: A continuous fast beep (indicating slow or no motion of a function, a single function is at the end of its travel, or that a function will not start due to overload or malfunction).	Lateral tilt transducer out of adjustment or cable/ turnbuckle assembly broken or loose.	Refer to Figure 2-2 to perform this check. Run the lateral tilt motor in one direction until the limit switch stops it. (The Emergency COMPUTER CONTROL OVERRIDE SWITCH must be pressed to do this). Check the output voltage of the Lateral tilt transducer with multimeter (Positive probe of multimeter into Test Point 4 and negative probe of multimeter into Test Point 6). Run the lateral tilt motor in the other direction until the other limit switch stops it. Check the output voltage of the lateral tilt transducer with multimeter (Positive probe of multimeter to Test Point 4 and negative probe of multimeter to Test Point 6). The low voltage reading should be 0.5 VDC or greater and the high voltage reading should be 4.75 VDC or less. The range between the low and high voltages should be at least 2.5 VDC.	Adjust the lateral tilt transducer. If the lateral tilt transducer cannot be adjusted properly (If the turnbuckle runs out of threads), reposition transducer. If the lateral tilt transducer still cannot be adjusted properly, replace or adjust cable/turnbuckle assembly.
		Lateral tilt transducer malfunctioning.	Refer to Figure 2-2 to perform this check. Insert positive probe of multimeter into Test Point 4 and negative probe of multimeter into Test Point 6. While pressing Emergency COMPUTER CONTROL OVERRIDE SWITCH, tilt the table top in both directions by pressing LATERAL TILT LEFT and LATERAL TILT RIGHT. The voltage reading of Test Point 4 should stay in the normal 0.5 thru 4.75 VDC range and the voltage values should change steadily and evenly when the table top is tilted in either direction.	Replace lateral tilt transducer.
		PC control board is malfunctioning or 5 amp fuse is blown.	Refer to Figure 2-2 to perform this check. While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the LATERAL TILT LEFT and LATERAL TILT RIGHT buttons and observe the LATERAL TILT UP L.E.D. and the LATERAL TILT DOWN L.E.D. on the PC control board. If the L.E.D.'s illuminate when their button is pressed, the trouble is either the lateral tilt transducer, lateral tilt capacitor, lateral tilt motor, lateral tilt limit switches, lateral tilt drive mechanism, or loose wiring. If the L.E.D.'s do not illuminate when their button is pressed, the trouble is in the PC control board/ 5 amp fuse is blown.	Replace 5 amp fuse or PC control board.
			Replace suspect PC control board with known working PC control board.	Replace PC control board.

Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
When operating the surgery table in single function mode, the LATERAL TILT LEFT and LATERAL TILT RIGHT functions will not work and the surgery table sounds warning beeps. - Continued	When operating surgery table in single function mode and the surgery table sounds the following warning beep: A continuous fast beep (indicating slow or no motion of a function, a single function is at the end of its travel, or that a function will not start due to overload or malfunction). - Continued	Wiring connections loose.	Check all wiring connections from PC control board to the lateral tilt motor, lateral tilt capacitor, lateral tilt transducer, and lateral tilt left and right limit switches.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Lateral tilt capacitor is weak or blown.	Replace suspect lateral tilt capacitor with known working lateral tilt capacitor.	Replace lateral tilt capacitor.
		Thermal overload switch in lateral tilt motor is activated.	—	Wait 10 to 20 minutes to allow the lateral tilt motor to cool.
		Lateral tilt motor malfunctioning.	Replace suspect lateral tilt motor with known working lateral tilt motor.	Replace lateral tilt motor.
		Lateral tilt left limit switch or lateral tilt right limit switch is malfunctioning.	Perform continuity check on suspect limit switch.	Replace lateral tilt left or right limit switch.
		Lateral tilt drive mechanism is malfunctioning.	Check for obvious damage or mis-alignment.	Remove and repair lateral tilt drive mechanism.
The PC control board sounds a one second interval beep when 4 out of 5 of the functions are pressed. When the suspect function is pressed, a fast beep is sounded and that function will not move.	When operating surgery table in single function or programmed mode and the surgery table sounds a one second interval beep (Indicating a transducer problem with a function).	One of the five transducers is out of adjustment or cable/turnbuckle assembly is loose or broken.	Refer to Figure 2-2 to perform this check. Check the five transducer fail L.E.D.'s on the PC control board; the LATERAL TILT FAIL L.E.D., FOOT FAIL L.E.D., (TRENDELENBURG) TILT FAIL L.E.D., BACK FAIL L.E.D., and (BASE) TABLE FAIL L.E.D.. If any are illuminated, that transducer is the one causing the problem.	Adjust the transducer. If the transducer cannot be adjusted properly (If the turnbuckle runs out of threads), reposition the transducer. If the transducer still cannot be adjusted properly, replace or adjust cable/turnbuckle assembly.
		One of the five transducers is malfunctioning.	Refer to Figure 2-2 to perform this check. Check the five transducer fail L.E.D.'s on the PC control board; the LATERAL TILT FAIL L.E.D., FOOT FAIL L.E.D., (TRENDELENBURG) TILT FAIL L.E.D., BACK FAIL L.E.D., and (BASE) TABLE FAIL L.E.D.. If any are illuminated, that transducer is malfunctioning.	Replace the transducer.
A function is run to the end of its travel and then it will not move.	A function moves properly to its end of travel, but will not allow movement away from the end of travel.	The transducer voltage setting has changed more than 13/100 VDC since the last time the PC control board was calibrated.	Check the adjustment of the suspect transducer.	Adjust the transducer and then perform a PC control board calibration.

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SECTION II
TESTING AND TROUBLESHOOTING

Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
The PC control board sounds a continuous tone while surgery table is ON.	The POWER ON / STANDBY switch is turned ON and the PC control board starts sounding a continuous tone (a function does not have to be in use for the signal to sound).	PC control board is malfunctioning.	Turn the POWER ON / STANDBY switch to OFF, wait 20 seconds, and turn the POWER ON / STANDBY switch to ON. If the continuous tone persists, the PC control board is malfunctioning.	Replace PC control board. Return malfunctioning PC control board to Midmark for possible repair.
The PC control board sounds a beep; one second on and four seconds off.	The POWER ON / STANDBY switch is turned ON and the PC control board sounds a beep; one second on and four seconds off.	The electrical supply to the surgery table is below 95 VAC.	Check the voltage level at the facility supply outlet.	Correct facility supply voltage problem. Surgery table is designed to operate properly between 100 VAC and 120 VAC.
ENABLE function cannot be selected.	Surgery table will not "enable" when the ENABLE button is pressed and two short beeps are sounded.	PC control board is not calibrated or has lost its calibration.	Check the low and high voltage settings of the transducers.	Adjust any transducers needing adjusted. Then run a calibration procedure on the surgery table to record the new low and high voltage settings into the PC control board's memory.
	Surgery table will not "enable" when the ENABLE Button is pressed.	PC control board malfunctioning.	Refer to Figure 2-2 to perform this check. Press the ENABLE button. Check to see if the ENABLE L.E.D. illuminates. If not, PC control board or pendant hand control is malfunctioning.	Replace pendant hand control or PC control board.
When operating individual functions, the surgery table begins to move, but stops almost immediately. When suspect function is re-selected, it operates correctly.	Trouble happens intermittently.	Transducer or actuator/motor drive components do not have free operation or contain backlash.	Check the transducer of the function that has the problem, for wear and free operation.	Ensure free operation of actuator/motor drive components for that function. Adjust transducer and then run a calibration procedure on the surgery table.
PC control board will not accept the calibration procedure even though the transducers are adjusted properly.	A function stops during the calibration procedure before it reaches a limit.	Transducer or actuator/motor drive system is "hanging up" or still contains backlash.	Check if any transducer fail L.E.D.'s are flashing at the end of the calibration procedure.	Ensure free operation of actuator/motor drive components for that function. Adjust transducer and then run a calibration procedure on the surgery table.
	A transducer fail L.E.D. flashes after a calibration procedure has been run even though the calibration procedure ran	Wiring has been connected incorrectly and one of the functions is operating in reverse (i.e.. TABLE UP	Check all of the functions to see if they operate in the direction specified on the pendant hand control (i.e.. TABLE UP is TABLE UP)	Check wiring harness against wiring diagram. Correct any incorrect wiring connections.

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Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
Table operates by itself.	ENABLE lamp is not illuminated and the ENABLE beep did not sound.	Relay on PC control board for the suspect function is malfunctioning (stuck on).	Check the relay operating L.E.D.'s to see if the L.E.D. for the suspect function is illuminated (No L.E.D.'s should be illuminated) and/or perform a voltage check on the relay output (should not be any voltage output).	Replace PC control board.
	ENABLE lamp is illuminated and the ENABLE beep did sound.	Hand control panel of pendant hand control is malfunctioning (membrane switch is malfunctioning on hand control panel) or push-button switch on foot control is malfunctioning (stuck on).	Replace suspect pendant hand control or foot control with known working pendant hand control or foot control.	Replace hand control panel of pendant hand control or push-button switch of foot control.
Surgery table operates correctly, but ON indicator lamp will not illuminate.	POWER ON / STANDBY switch is ON and unit is plugged in, but ON indicator lamp will not illuminate.	ON indicator lamp malfunctioning.	Replace suspect ON indicator lamp with known working lamp or perform continuity check on lamp.	Replace ON indicator lamp.
		Wiring connections loose.	Check all wiring connections from POWER ON / STANDBY switch to ON indicator lamp.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
STANDBY indicator lamp will not illuminate.	POWER ON / STANDBY switch is turned to STANDBY, and unit is plugged in, but OFF indicator lamp will not illuminate.	STANDBY indicator lamp malfunctioning.	Replace suspect STANDBY indicator lamp with known working lamp or perform continuity check on lamp.	Replace STANDBY indicator lamp.
		Wiring connections loose.	Check all wiring connections from POWER ON / STANDBY switch to STANDBY indicator lamp.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
ENABLE indicator lamp will not illuminate.	The ENABLE button is pressed on pendant hand control or foot control and the single beep acknowledging acceptance of the command is sounded, but the ENABLE indicator lamp will not illuminate.	ENABLE indicator lamp malfunctioning.	Replace suspect ENABLE indicator lamp with known working lamp or perform continuity check on lamp.	Replace ENABLE indicator lamp.
		Wiring connections loose.	Check all wiring connections from PC control board to ENABLE indicator lamp.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.

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SECTION III
SCHEDULED MAINTENANCE

3-1. Scheduled Maintenance

Table 3-1 is a Scheduled Maintenance Chart which lists the inspections and services that should be performed periodically on the surgery table. These inspections and services should be performed as often as indicated in the chart.

Table 3-1. Scheduled Maintenance Chart

Interval	Inspection or Service	What to Do
Semi-annually	Obvious damage	Visually check condition of surgery table for obvious damage such as: Cracks in components, missing components, dents in components, damaged wiring, or any other visible damage which would cause surgery table to be unsafe to operate or would compromise the performance of the surgery table. Repair surgery table if necessary.
	Fasteners/hardwar	Check surgery table for missing or loose fasteners/hardware. Replace any missing hardware and tighten any loose hardware as necessary.
	Indicator lamps	Check all indicator lamps for proper operation/illumination. Replace any malfunctioning indicator lamps.
	PC control board sound emitter	Check that the PC control board emits the proper audible signals. Replace PC control board if sound emitter on board doesn't work.
	Warning and instructional decals	Check for missing or illegible decals. Replace decals as necessary.
	Wiring connections	Check the integrity of all wiring connections. Clean all dirty connections. Tighten any loose connections. Replace any damaged connections.
	Wires	Check for pinching and cutting of wires. Route wires away from pinch area or replace/repair all cut wires.
	Ball screws of actuators	Extend each actuator and wipe ball screw threads down with a rag to remove foreign matter. Coat as much of ball screw threads as possible with STP treatment oil or equivalent. Run each actuator to both ends of its travel a couple of times to spread the oil evenly over all of the ball screw threads and then remove the excess oil. NOTE: The foot actuator and the back actuator will need to have their covers removed to gain access to their ball screws.
	Casters	Depress brake pedal and check the braking power of the casters. Adjust or replace any malfunctioning casters.
	Actuators	Operate each actuator and listen for squealing noises, indicating a bad actuator. Coat ball screw of noisy actuator with STP treatment oil or equivalent. If the oil does not correct the problem, replace the noisy actuator.
	Ratchet knobs	Check that the ratchet knobs operate smoothly and lock in position. Replace or repair ratchet knobs as necessary.
	Switch lever	Check switch lever of POWER ON / STANDBY switch for looseness. If loose, coat threads of screw with removable thread locking adhesive and tighten screw.
	Ratchet headrest	Check that ratchet headrest is operational and provides positive locking. Repair or replace ratchet headrest.
	Upholstery wings	Check all upholstery wings for cracks. Check that each wing locks properly into position. Replace any damaged upholstery wings.
	Articulating headrest assembly	Check that the articulating headrest assembly is operational and will support a static load of 80 - 100 lbs (36.3 - 45.4 kg). If not, adjust the articulating headrest assembly. If a proper adjustment cannot be achieved, send the articulating headrest assembly to Midmark for repair.
	Transducers for proper adjustment	Refer to adjustment paragraphs and check the adjustment of each transducer. Adjust any transducers out of adjustment.
	Calibration of surgery table	Perform a PC control board calibration procedure.
	Operational test	Perform an Operational Test to determine if the surgery table is operating within its specifications (Refer

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SECTION IV
MAINTENANCE / SERVICE INSTRUCTIONS

4-1. Introduction

DANGER

Always disconnect all electrical power from the surgery table before removing any of the table's covers/shrouds or making any repairs to prevent the possibility of electrical shock. If electrical power must be connected while performing repairs or adjustments, do not touch any bare wires or terminals. Failure to comply with these instructions could result in serious personal injury or death.

DANGER

Refer to the Operator Manual for complete instructions on operating the surgery table. Failure to do so could result in personal injury.

NOTE

Perform an operational test on the surgery table after the repair is completed to confirm the repair was properly made and that *all* malfunctions were repaired.

If, during a procedure, mounting hardware or an area in the surgery table needing to be reached, is in a position where it is unable to be accessed, there are two methods that can be used to obtain access: Press a function button to move the surgery table to a position which will give you access. If the transducer for that function has been disconnected or removed, press the Emergency COMPUTER CONTROL OVERRIDE SWITCH and the desired function button simultaneously to move the surgery table to a position which will give you access.

During a procedure, you may have been instructed to disconnect electrical power and then later in the procedure, instructed to perform a function movement, transducer adjustment, etc. that requires electrical power. Even though it is not stated, it is implied that you are to re-connect electrical power to the surgery table in this case.

The following paragraphs contain removal, installation, repair, and adjustment procedures for the surgery table.

4-2. Back Cover Removal / Installation.

A. Removal

(1) Remove large handle (1, Figure 4-1) from tube weldment (2) by unscrewing large handle.

(2) Remove two small handles (3) from outer tube weldment (4) by unscrewing small handles.

NOTE

To remove back cover, carefully spread slot in back cover to allow back cover to be pulled from around the shaft of back actuator.

(3) Remove eight screws (5) and back cover (6) from back casting (7).

B. Installation

(1) Spread the slot in back cover (6) and slide back cover over shaft of back actuator.

(2) Position back cover (6) on back casting (7) and secure with eight screws (5).

(3) Install two small handles (3) in outer tube weldment (4) by screwing small handles in.

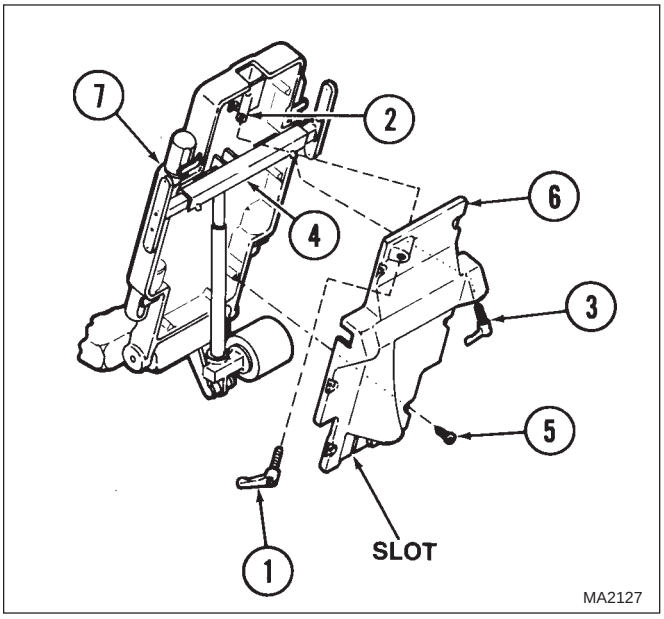

Figure 4-1. Back Cover Removal / Installation

(4) Install large handle (1) in tube weldment (2) by screwing large handle in.

4-3. Lower Bellows Assembly for Access.

A. Lower Bellows Assembly

(1) Remove four screws (1, Figure 4-2) and lower bellows assembly (2) from trendelenburg plate (3).

B. Raise Bellows Assembly

NOTE
Lowering the table top to its lowest position makes the following step much easier.

(1) Raise bellows assembly (2) against trendelenburg plate (3) and secure in position with four screws (1).

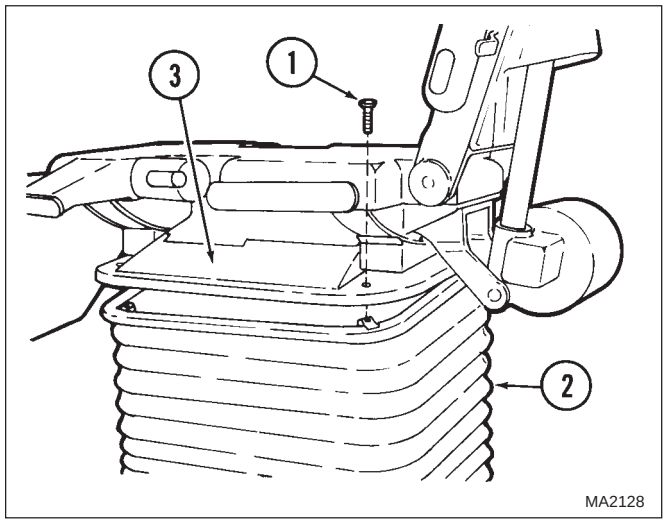

Figure 4-2. Lower Bellows Assembly For Access

4-4. Electrical Cover Removal / Installation

A. Removal

(1) Disconnect coil cord (1, Figure 4-3) from connector (2).

(2) Disconnect electrical power from the surgery table.

(3) Remove four screws (3) and electrical cover (4) from inner shroud (5) by pulling outward on the bottom of the electrical cover and then downward.

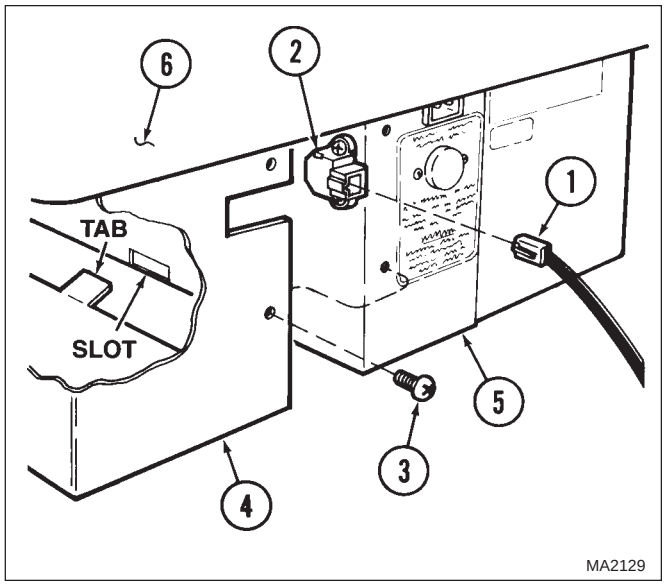

Figure 4-3. Electrical Cover Removal / Installation

B. Installation

(1) Insert the top edge of electrical cover (4) under lip of base casting (6) first, and then push the bottom edge inward.

NOTE
Because of the limited working room, installing the electrical cover can be difficult, especially inserting the tabs of the electrical cover in the slots of inner shroud. Bending the tabs upward slightly makes it easier for the tabs to be inserted into the slots.

(2) Position electrical cover (4) on inner shroud (5) by inserting two tabs of electrical cover in two slots of inner shroud.

(3) Secure electrical cover (4) to inner shroud (5) with four screws (3).

(4) Connect coil cord (1) to connector (2).

(5) Connect electrical power to the surgery table.

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4-5. Back Actuator Removal / Disassembly / Assembly / Installation

A. Removal

NOTE
If the back actuator is being replaced as an assembly, the disassembly/assembly procedure should not be performed. The disassembly/assembly procedure is for repairing the back actuator.

(1) If the back actuator is operable, raise the table top as high as it will go.

(2) Disconnect electrical power from the surgery table.

(3) Lower the bellows assembly (Refer to para 4-3).

(4) Remove the back cover (Refer to para 4-2).

(5) Remove three screws (1, Figure 4-4) and clips (2) securing back actuator wire harness (3) to trendelenburg plate (4).

(6) Remove screw (5), starwasher (6), and ground terminal of back actuator wire harness (3) from trendelenburg plate (4).

(7) Disconnect back actuator wire harness (3) from wire harness (7).

NOTE
Perform step 8 if the surgery table is an early model. Perform steps 9 thru 11 if the surgery table is a late model. See Figure 4-4 to determine if you have an early model or a late model.

(8) Pull back actuator wire harness (3) out of surgery table.

(9) Tag three individual wires (8) of back actuator wire harness (3).

(10) Using pin extractor, extract three wires (8) from connector (9). Refer to Table 1-2 for special tools.

(11) Pull back actuator wire harness (3) thru wire hole in trendelenburg plate (4) and out of surgery table.

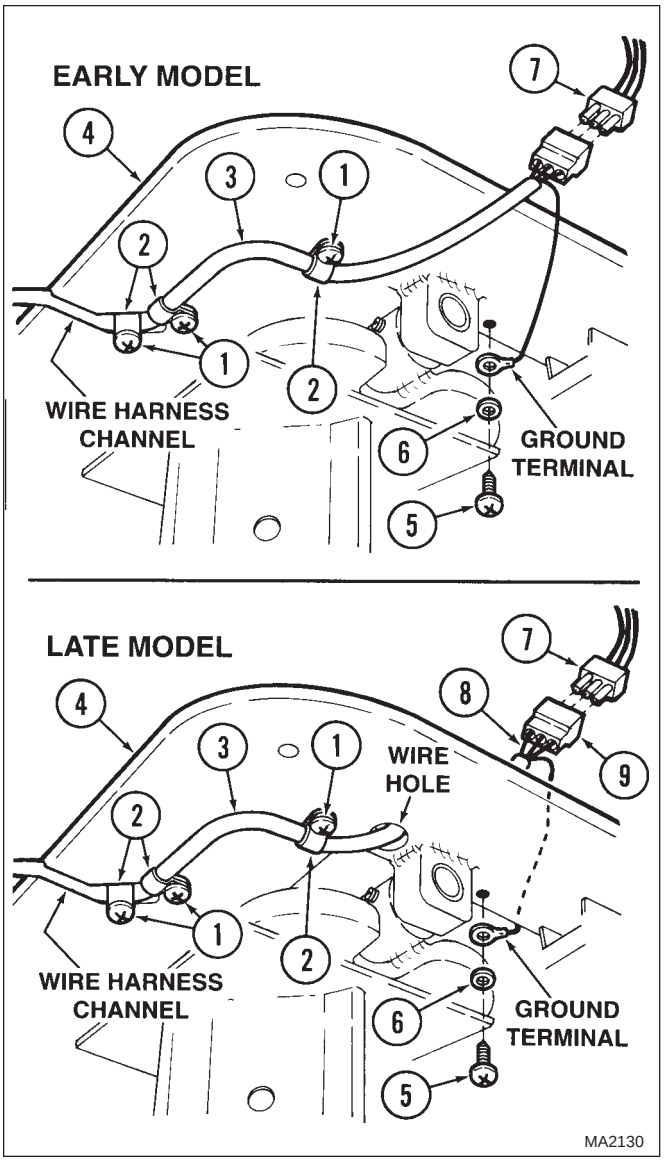

Figure 4-4. Back Actuator Wire Harness Disconnection / Connection

CAUTION
Do not lower the back casting or let the back casting fall downward. If the back casting goes down past the horizontal plane, damage to the back transducer and/or cable/turnbuckle assembly will result.

(12) While supporting the back casting (1, Figure 4-5), remove two E-rings (2), clevis pin (3), and separate the shaft of back actuator (4) from outer tube weldment (5). Let the back actuator hang from its remaining mounting hardware.

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SECTION IV
MAINTENANCE / SERVICE

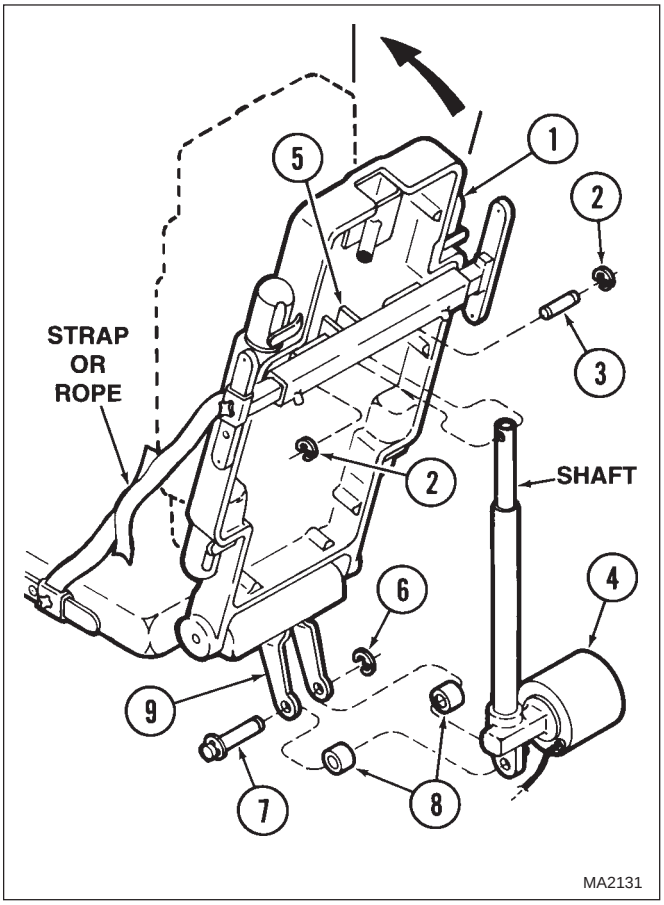

Figure 4-5. Back Actuator Removal / Installation

(13) Raise the back casting (1) as far as it will go and securely tie the back casting in this position with straps or ropes.

(14) Remove two E-rings (6), clevis pin (7), two plastic spacers (8), and back actuator (4) from back clevis (9).

B. Disassembly

(1) Remove three screws (1, Figure 4-6) and motor cover (2) from motor cover mount (3).

(2) Disconnect motor assembly wire harness (4) from back actuator wire harness (5).

(3) Remove two nuts (6), motor assembly (7), and motor cover mount (3) from actuator mechanism (8).

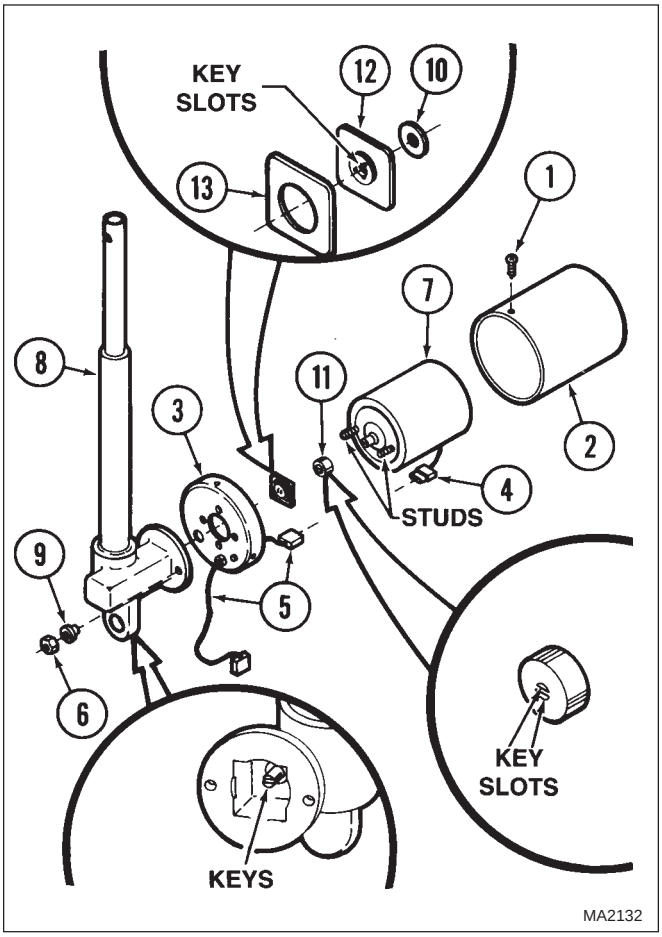

Figure 4-6. Back Actuator Disassembly / Assembly

(4) Remove two shoulder washers (9) from actuator mechanism (8).

(5) Remove spacer (10) and motor coupler (11) from shaft of motor assembly (7).

NOTE
A needle nose pliers should be used to extract the actuator brake from the actuator mechanism. Grasp the raised round plate of the actuator brake with the pliers and pull.

(6) Remove actuator brake (12) and rubber damper (13) from shaft of actuator mechanism (8).

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C. Assembly

NOTE
The rubber damper should be installed so its flat side faces the inside of the actuator mechanism. The actuator brake should be installed so its flattest side faces outward. The shaft of the actuator mechanism may be turned with a screwdriver to help align the keys of the actuator mechanism shaft with the key slots in actuator brake.

(1) Install rubber damper (13, Figure 4-6), actuator brake (12), and spacer (10) in actuator mechanism (8). Press parts firmly into actuator mechanism to ensure they are seated properly.

NOTE
The motor cover mount should be installed so the back actuator wire harness, which is routed thru the motor cover mount, will be located at the bottom side of the actuator mechanism.

(2) Install motor cover mount (3) on studs of motor assembly (7).

(3) Install motor coupler (11) on shaft of motor assembly (7).

(4) Install two shoulder washers (9) in actuator mechanism (8).

NOTE
The alignment in the following step can be difficult and may not always be obtained every time. If the alignment is off, the back actuator will make a grinding sound and will not move. To check for proper alignment before proceeding to step 6, temporarily connect the back actuator wire harness to the surgery table. While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the BACK UP button for a few seconds. The back actuator should run normally and should not make a grinding sound. If a grinding sound is made, repeat step (5) until proper alignment is achieved.

(5) Align the keys of the actuator mechanism (8) shaft with the key slots of the motor coupler (11) and then install the motor assembly (7) on actuator mechanism (8) and secure with two nuts (6).

(6) Connect back actuator wire harness (5) to motor assembly wire harness (4).

NOTE
The motor cover should be installed so the caution label is facing upward where it will be visible.

(7) Install motor cover (2) on motor cover mount (3) and secure with three screws (1).

D. Installation

(1) Install the back actuator (4, Figure 4-5) on back clevis (9) and secure with two plastic spacers (8), clevis pin (7), and two E-rings (6).

CAUTION
Do not lower the back casting past its horizontal plane or let the back casting fall downward. If the back casting goes down past the horizontal plane, damage to the back transducer and/or cable/turnbuckle assembly will result.

(2) Remove the straps or ropes and lower the back casting (1) until the shaft of the back actuator (4) can be positioned on outer tube weldment (5).

(3) Secure the shaft of back actuator (4) to outer tube weldment (5) with clevis pin (3) and two E-rings (2).

NOTE
Perform step 4 if the surgery table is an early model. Perform steps 5 and 6 if the surgery table is a late model. See Figure 4-4 to determine if you have an early model or late model.

(4) Route back actuator wire harness (3, Figure 4-4) into surgery table.

(5) Route back actuator wire harness (3) thru wire hole in trendelenburg plate (4) and into surgery table.

(6) Insert three wires (8) into connector (9).

(7) Connect back actuator wire harness (3) to wire harness (7).

(8) Install ground terminal of back actuator wire harness (3) on trendelenburg plate (4) and secure with starwasher (6) and screw (5).

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NOTE
The clip which is installed closest to the outside edge of the trendelenburg plate must be installed upside down in the wire harness channel. The portion of the wire harness closest to the outside edge of the trendelenburg plate should also be routed into the wire harness channel. Otherwise, the bellows assembly will be obstructed.

(9) Position back actuator wire harness (3) on trendelenburg plate (4) and secure with three clips (2) and screws (1).

(10) Install the back cover (Refer to para 4-2).

(11) Raise the bellows assembly (Refer to para 4-3).

(12) Connect electrical power to the unit.

4-6. Back Transducer Removal / Installation

A. Removal

NOTE
The procedure can be performed from either side of the surgery table. The illustration shown is from the patients right side of the surgery table.

(1) Press the ENABLE button and then press either the LATERAL TILT RIGHT button or the LATERAL TILT LEFT until the lateral tilt function reaches the end of its travel.

(2) Disconnect wire harness (1, Figure 4-7) from back transducer (2).

(3) While holding cable/turnbuckle assembly (3), loosen nut (4).

(4) Unscrew cable/turnbuckle assembly (3) from transducer rod (5).

(5) Cut cable tie (6) which secures wire harness (1) to back transducer (2).

(6) Using a pencil or sharp object, mark the present position of back transducer (2) on the seat casting (7) by tracing the outline of the back transducer mounting brackets.

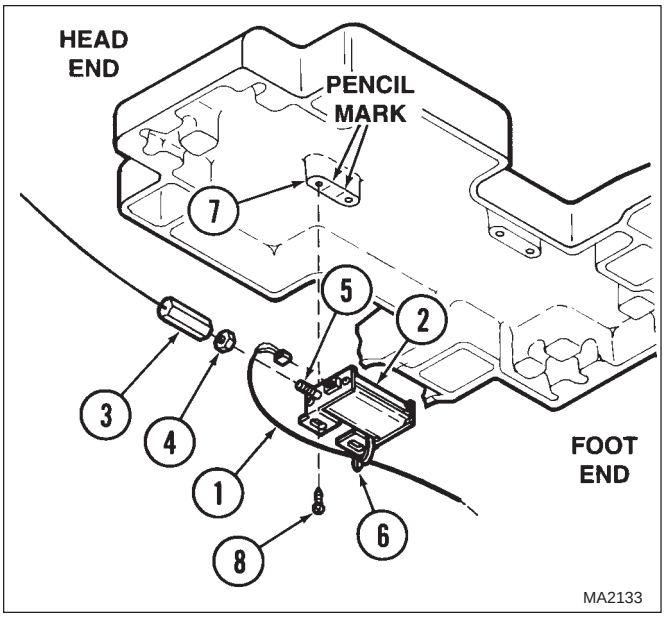

Figure 4-7. Back Transducer Removal / Installation

(7) Remove two screws (8) and back transducer (2) from seat casting (7).

(8) Remove nut (4) from transducer rod (5).

B. Installation

(1) Screw nut (4) onto transducer rod (5) fully until the threads run out.

(2) Position back transducer (2) on seat casting (7) and align the back transducer with the pencil marks made during removal. Secure the back transducer (2) in position with two screws (8).

(3) Secure wire harness (1) to back transducer (2) with cable tie (6).

(4) Screw cable/turnbuckle assembly (3) onto transducer rod (5) until half of the transducer rod's threads are covered.

(5) Connect wire harness (1) to back transducer (2).

(6) Adjust the back transducer (Refer to para 4-7).

4-7. Back Transducer Adjustment

A. Adjustment

(1) Remove electrical cover (Refer to para 4-4).

(2) Plug the positive probe of the multimeter into Test Point 3 and the negative probe of the multimeter into Test Point 6 of PC control board. See Figure 4-8.

NOTE
If back transducer adjustment procedure is being performed as a result of installing a new back transducer, steps (3) and (5) will already be completed and will not need to be performed.

The procedure can be performed from either side of the surgery table. The illustration shown is from the patient's right side of the surgery table.

(3) Press the ENABLE button and then press either the LATERAL TILT RIGHT button or the LATERAL TILT LEFT until the lateral tilt function reaches the end of its travel.

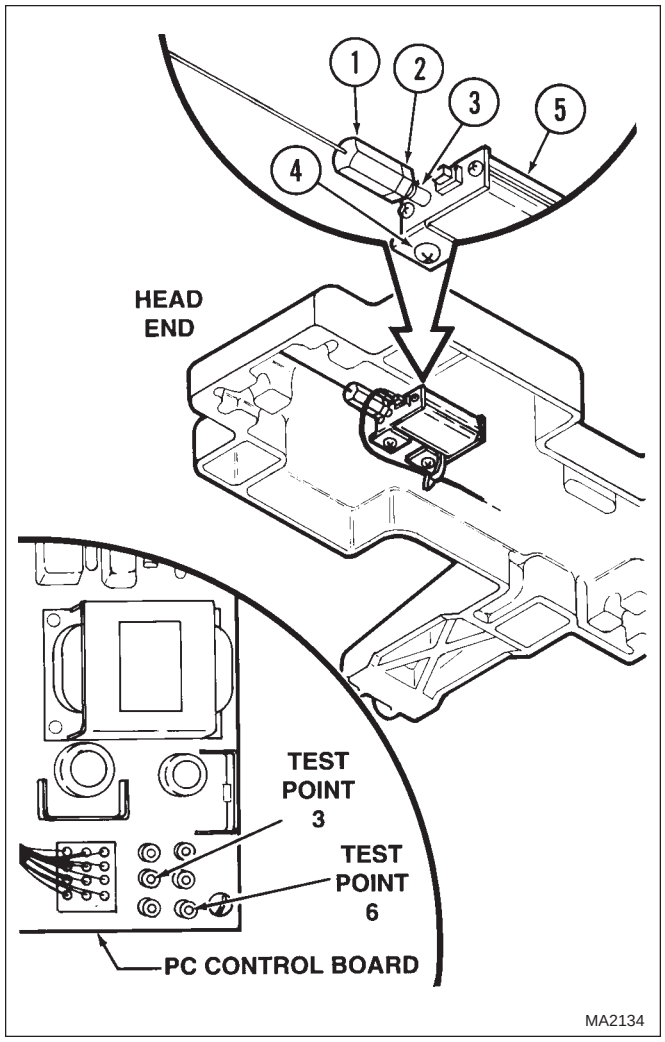

Figure 4-8. Back Transducer Adjustment

NOTE
Allow the bearing in the back actuator to spin for a few seconds after the back function has reached the end of its travel, to ensure that the end of travel has been reached.

(4) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the BACK UP button until the back function reaches the end of its travel.

(5) While holding cable/turnbuckle assembly (1, Figure 4-8), loosen nut (2).

NOTE
The desired setting for the back transducer is 0.5 VDC. The setting cannot be lower than 0.5 VDC but may go up to 1.0 VDC.

(6) Screw in or unscrew cable/turnbuckle assembly (1) until the multimeter reads 0.5 VDC + 0.5 VDC/-0.0 VDC. If the proper voltage setting is obtained, proceed to step 10. If the cable/turnbuckle assembly (1) runs out of adjustment before the proper voltage setting is obtained, perform steps 7 thru 9. If the proper voltage setting still cannot be obtained, the cable/turnbuckle assembly (1) is stretched and must be shortened slightly or a knot in cable has loosened and must be retied.

(7) Screw or unscrew the cable/turnbuckle assembly (1) until it is centered on the threads of the transducer rod (3).

NOTE
Slide the back transducer toward the head end of the surgery table if the voltage setting cannot be adjusted low enough. Slide the back transducer toward the foot end of the surgery table if the voltage setting cannot be adjusted high enough.

(8) Loosen two screws (4) and slide the back transducer (5) toward the head end *or* foot end of the surgery table as determined necessary.

(9) Tighten two screws (4). Repeat step 6.

(10) While holding cable/turnbuckle assembly (1), tighten nut (2), making sure the voltage setting does not change.

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NOTE
Allow the bearing in the back actuator to spin for a few seconds after the back function has reached the end of its travel, to ensure that the end of travel has been reached.

(11) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the BACK DOWN button until the back function reaches the end of its travel.

(12) Check the voltage reading of the multimeter. The voltage reading must be between 3.0 - 4.75 VDC. The difference between the voltage measured in step 6 and the voltage measured in this step must be at least 2.5 VDC. If not, repeat steps 4 thru 12. If problem persists, back transducer may be malfunctioning.

(13) Remove positive and negative probes of multimeter from Test Points 3 and 6.

(14) Perform a PC control board calibration (Refer to para 4-33).

(15) Install electrical cover (Refer to para 4-4).

4-8. Base Actuator Removal / Disassembly / Assembly / Installation

A. Removal

NOTE
If the base actuator is being replaced as an assembly, the disassembly/assembly procedure should not be performed. The disassembly/assembly procedure should only be performed if the base actuator is being repaired.

(1) Depress the brake pedal to apply the brakes.

NOTE
There are two methods which can be used to support the table top while removing the base actuator; supports/jacks or a 3/8" diameter steel rod. Steps 2, 5, and 6 do not need to be performed if a 3/8" diameter steel rod is going to be used to support the table top, as described in step 7, instead of supports or jacks.

(2) Remove the back cover (Refer to para 4-2).

(3) Lower bellows assembly (Refer to para 4-3).

(4) Remove electrical cover (Refer to para 4-4).

(5) If the base actuator is still operable, raise the table top to its highest position.

(6) Operate the surgery table to get the foot section, seat section, and head section of the table top to a horizontal position. See Figure 4-9.

DANGER
Support the table top securely. Failure to do so could allow the table top to fall, causing serious personal injury.

NOTE
The supports/jacks need only support the straight downward weight of the table top. The table top will not be able to tip sideways because the column assembly will still be connected.

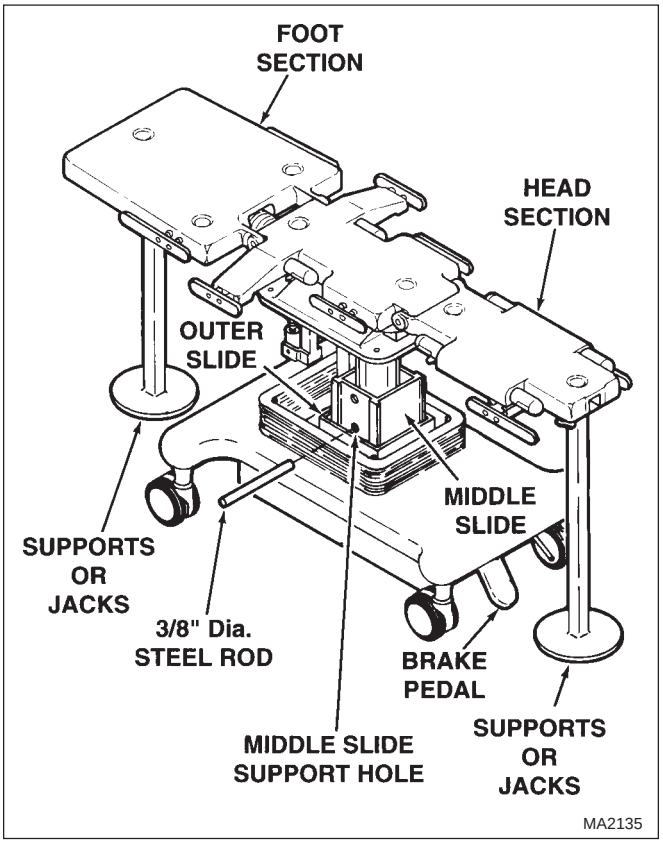

Figure 4-9. Preparing For Base Actuator Removal

(7) Support the table top by positioning supports or jacks under the foot section and head section of the table top ***or*** if the base actuator is operable, move the table top until the middle slide support hole lines up with the top of the outer slide, and then insert a 3/8 inch diameter steel rod thru the middle slide support holes, making sure the steel rod sticks out past both sides of the outer slide. Lower table top until it is fully supported by steel rod.

(8) Disconnect electrical power from the surgery table.

(9) Using a screwdriver, pry tab of capacitor mounting bracket (1, Figure 4-10) upward and remove base capacitor (2) from capacitor mounting bracket.

(10) Remove capacitor cap (3) from base capacitor (2).

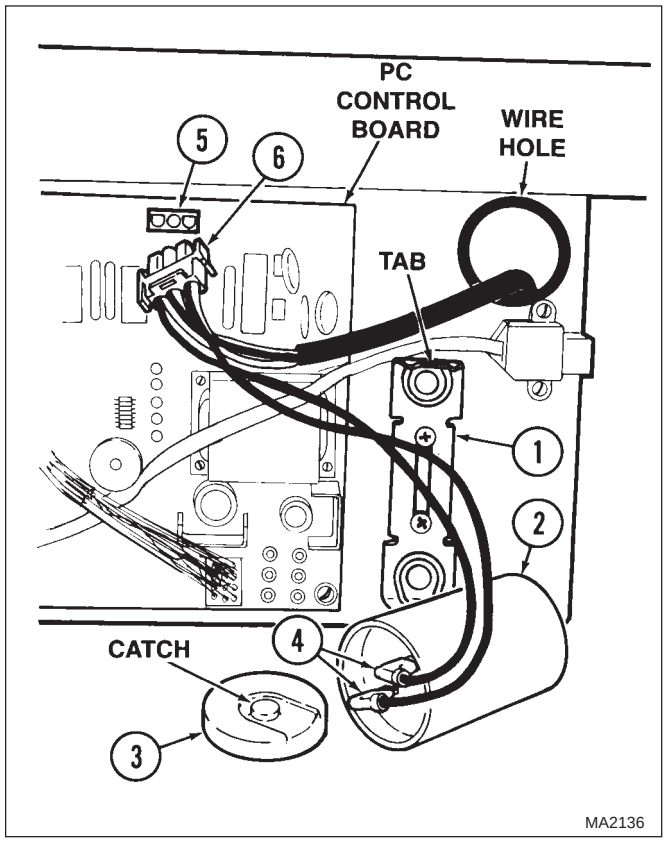

Figure 4-10. Base Actuator Electrical Disconnection/Connection

DANGER

The capacitor contains stored electricity. Never touch terminals of a capacitor, even if power has been shut off. Always discharge capacitor before touching capacitor terminals or wires. Failure to comply with these instructions could result in serious personal injury or death.

(11) Discharge the base capacitor (2).

(12) Disconnect two wires (4) from terminals of base capacitor (2).

(13) Disconnect base actuator wire harness (6) from connector (5).

(14) Feed the base actuator wire harness (6) thru wire hole and into the base of the surgery table.

(15) Cut cable tie (1, Figure 4-11) securing base actuator wire harness (2) and base transducer wire harness (3) to motor housing of base actuator (4).

(16) Remove screw (5) and cable assembly (6) from middle slide (7).

DANGER

The following step frees the weight of the surgery table from the base actuator. Failure to have the table top properly supported could result in serious personal injury.

(17) Loosen two pivot screws (8) until the shaft of the base actuator (4) separates from middle slide (7).

NOTE

The following step does not apply to early models, because early models do not have a hole plug.

(18) Remove hole plug (9) from outer shroud (10).

(19) Remove one E-ring (11) from clevis pin (12).

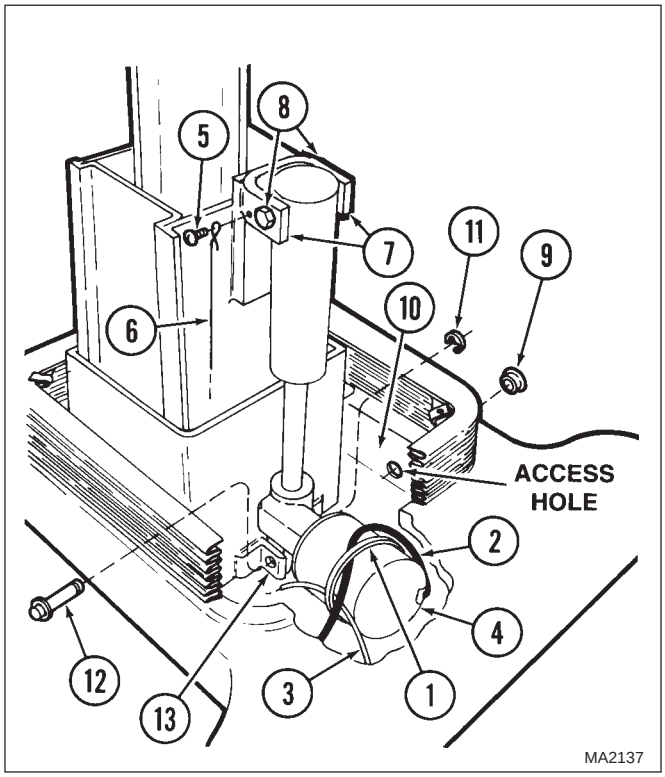

Figure 4-11. Base Actuator Removal / Installation

NOTE
Early models do not have an access hole and the clevis pin must be removed by hand.

(20) Insert a long punch or screwdriver thru access hole and drive clevis pin (12) from outer slide (13).

(21) Remove the base actuator (4) from base of surgery table.

B. Disassembly

(1) Remove two nuts (1, Figure 4-12) and motor assembly (2) from actuator mechanism (3).

(2) Remove two shoulder washers (4) from actuator mechanism (3).

(3) Remove spacer (5) and motor coupler (6) from shaft of motor assembly (2).

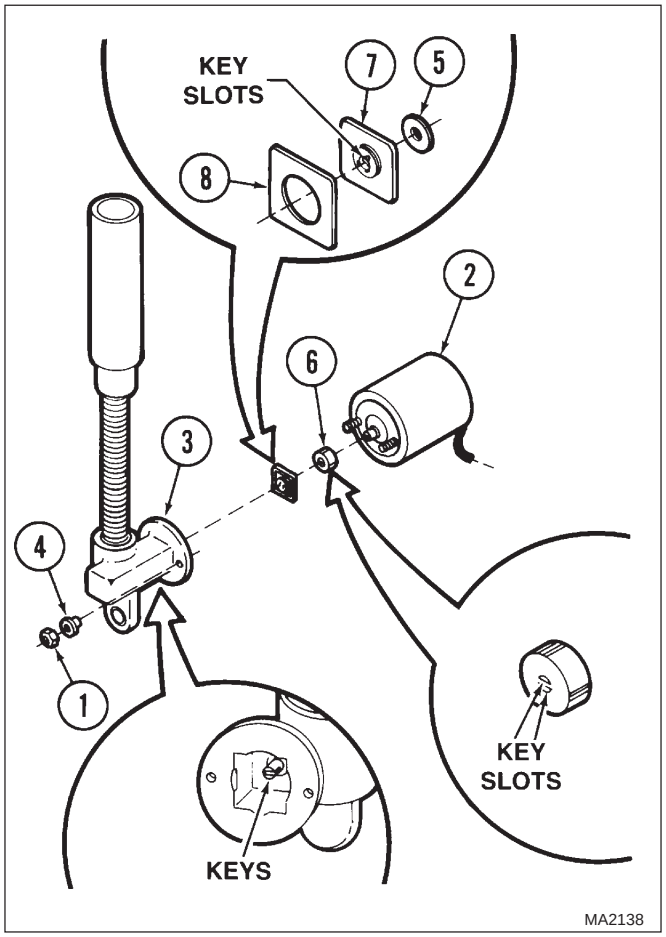

Figure 4-12. Base Actuator Disassembly / Assembly

NOTE
A needle nose pliers should be used to extract the actuator brake from the actuator mechanism. Grasp the raised round plate of the actuator brake with the pliers and pull.

(4) Remove actuator brake (7) and rubber damper (8) from shaft of actuator mechanism (3).

C. Assembly

NOTE
The rubber damper should be installed so its flat side faces the inside of the actuator mechanism. The actuator brake should be installed so its flattest side faces outward. The shaft of the actuator mechanism may be turned with a screwdriver to help align the keys of the actuator mechanism shaft with the key slots in actuator brake.

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(1) Install rubber damper (8, Figure 4-12), actuator brake (7), and spacer (5) in actuator mechanism (3). Press parts firmly into actuator mechanism to ensure they are seated properly.

(2) Install motor coupler (6) on shaft of motor assembly (2).

(3) Install two shoulder washers (4) in actuator mechanism (3).

NOTE
The alignment in the following step can be difficult and may not always be obtained every time. If the alignment is off, the base actuator will make a grinding sound and will not move. To check for proper alignment before installing the base actuator, temporarily connect the base actuator wire harness to the surgery table. While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TABLE UP button for a few seconds. The base actuator should run normally and should not make a grinding sound. If a grinding sound is made, repeat step (4) until proper alignment is achieved.

(4) Align the keys of the actuator mechanism (3) with the key slots of motor coupler (6) and then install the motor assembly (2) on actuator mechanism (3) and secure with two nuts (1).

D. Installation

(1) Position the base actuator (4, Figure 4-11) inside the base of the surgery table.

NOTE
The clevis pin should be installed with one of the two E-rings already installed and should be inserted from the side opposite the access hole. Otherwise, the remaining E-ring will be very difficult to install.

(2) Install base actuator (4) on outer slide (13) and secure with clevis pin (12) and E-ring (11).

(3) Coat threads of two pivot screws (8) with permanent thread locking adhesive (Loctite 262).

NOTE
The shaft of the base actuator may be rotated to help align it with the middle slide weldment. Rotating the shaft either lengthens or shortens it.

(4) Install shaft of base actuator (4) on middle slide (7) and secure by tightening two pivot screws (8).

NOTE
The following step does not apply to early models, because the early models do not have a hole plug.

(5) Install hole plug (9) in access hole of outer shroud (10).

(6) Position base actuator wire harness (2) and base transducer wire harness (3) on motor housing of base actuator (4) and secure with cable tie (1).

(7) Feed the base actuator wire harness (6, Figure 4-10) out thru the wire hole.

(8) Connect wire harness (6) to connector (5).

(9) Connect two wires (4) to terminals of base capacitor (2).

(10) Install capacitor cap (3) on base capacitor (2).

NOTE
Pull gently on the base capacitor to ensure that it is properly locked into position.

(11) Position the bottom of the base capacitor (2) on capacitor mounting bracket (1) and then push the top of the base capacitor in. Using a screwdriver, force the tab of the capacitor mounting bracket (1) down over the catch of the capacitor cap (3).

(12) Connect electrical power to the surgery table.

(13) Remove supports, jacks, or 3/8 inch diameter steel rod.

(14) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TABLE UP button until the base actuator reaches the end of its travel.

CAUTION
The metal cable holder of the cable assembly must be installed so it is pointing straight down or the transducer voltage output could be changed.

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(14) Install the cable assembly (6, Figure 4-11) on middle slide (7) and secure with screw (5).

CAUTION
The cables must be routed properly as shown in the illustration or the base function will not operate.

(15) Feed cable assembly (1, Figure 4-13) onto base capstan (2) as shown. If necessary, feed cable/turnbuckle assembly (3) onto base output gear (4) as shown.

(16) Raise bellows assembly (Refer to para 4-3).

(17) If removed, install the back cover (Refer to para 4-2).

(18) Perform a PC control board calibration (Refer to para 4-33).

(19) Install electrical cover (Refer to para 4-4).

4-9. Base Transducer Removal / Installation

A. Removal

(1) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TABLE UP button until the base function reaches the end of its travel.

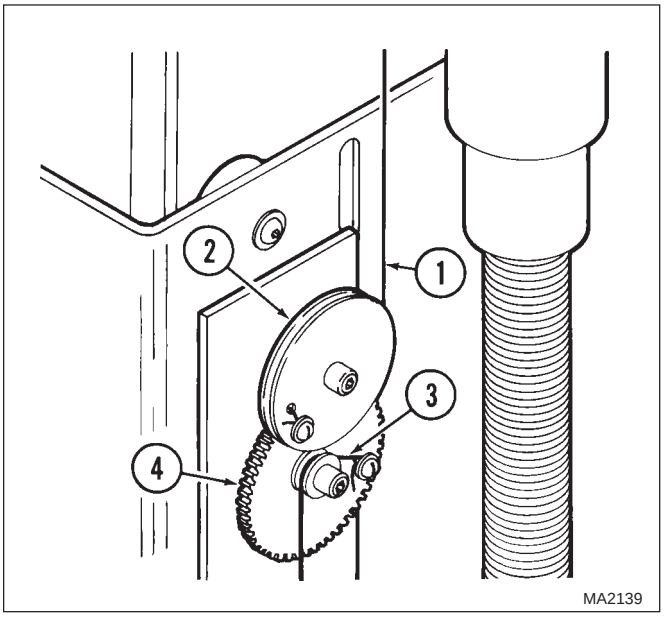

Figure 4-13. Cable Routing

(2) Lower the bellows assembly (Refer to para 4-3).

(3) Disconnect wire harness (1, Figure 4-14) from base transducer (2).

(4) While holding cable/turnbuckle assembly (3), loosen nut (4).

(5) Unscrew cable/turnbuckle assembly (3) from transducer rod (5).

(6) Using tape or a sharp object, mark the present position of base transducer (2) on the base reducer plate (6) by tracing the outline of the base transducer mounting brackets.

(7) Remove two screws (7) and base transducer (2) from base reducer plate (6).

(8) Remove nut (4) from transducer rod (5).

B. Installation

(1) Screw nut (4) onto transducer rod (5) fully until the threads run out.

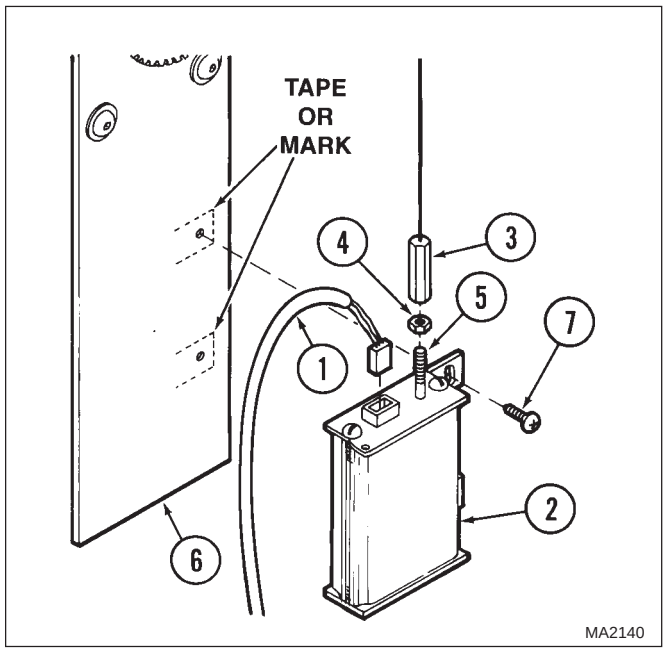

Figure 4-14. Base Transducer Removal / Installation

(2) Position base transducer (2) on base reducer plate (6) and align the base transducer with the taping or marks made during removal. Secure the base transducer (2) in position with two screws (7).

(3) Screw cable/turnbuckle assembly (3) onto transducer rod (5) until half of the transducer rod's threads are covered.

(4) Connect wire harness (1) to base transducer (2).

(5) Adjust the base transducer (Refer to para 4-10).

4-10. Base Transducer Adjustment

A. Adjustment

(1) Remove electrical cover (Refer to para 4-4).

(2) Lower the bellows assembly (Refer to para 4-3).

(3) Plug the positive probe of the multimeter into Test Point 5 and the negative probe of the multimeter into Test Point 6 of PC control board. See Figure 4-15.

NOTE
Allow the bearing in the base actuator to spin for a few seconds after the base function has reached the end of its travel, to ensure that the end of travel has been reached.

(4) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TABLE UP button until the base function reaches the end of its travel.

NOTE
If base transducer adjustment procedure is being performed as a result of installing a new base transducer, step 5 will already be completed and will not need to be performed.

(5) While holding cable/turnbuckle assembly (1, Figure 4-15), loosen nut (2).

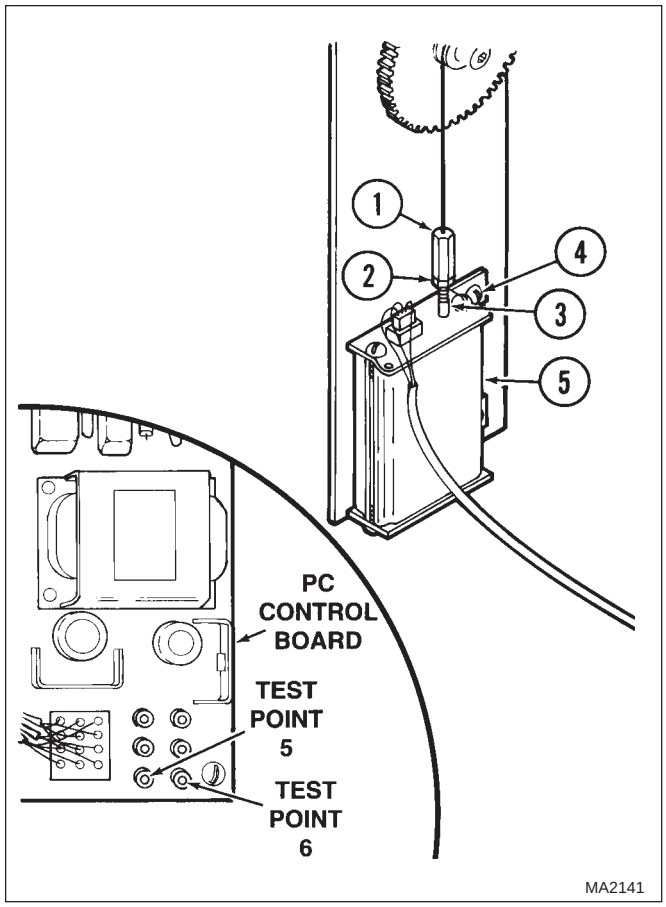

Figure 4-15. Base Transducer Adjustment

NOTE
The desired setting for the base transducer is 4.5 VDC. The setting cannot be lower than 3.5 VDC, but may go up to 4.75 VDC.

(6) Screw in or unscrew cable/turnbuckle assembly (1) until the multimeter reads 4.5 VDC + 0.25 VDC/ -1.0 VDC. If the proper voltage setting is obtained, proceed to step 10. If the cable/ turnbuckle assembly (1) runs out of adjustment before the proper voltage setting is obtained, perform steps 7 thru 9. If the proper voltage setting still cannot be obtained, the cable/ turnbuckle assembly (1) is stretched and must be shortened slightly or a knot in cable has loosened and must be retied.

(7) Screw or unscrew the cable/turnbuckle assembly (1) until it is centered on the threads of the transducer rod (3).

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NOTE
Slide the base transducer downward if the voltage setting cannot be adjusted high enough. Slide the base transducer upward if the voltage setting cannot be adjusted low enough.

(8) Loosen two screws (4) and slide base transducer (5) upward or downward as necessary.

(9) Tighten two screws (4). Repeat step 6.

(10) While holding cable/turnbuckle assembly (1), tighten nut (2), making sure the voltage setting does not change.

CAUTION
Hold bellows assembly up slightly on side of surgery table which contains the E-chain to prevent E-chain from coming into contact with bellows assembly when the table top is lowered. Failure to do so could result in damage to bellows assembly.

NOTE
Allow the bearing in the base actuator to spin for a few seconds after the base function has reached the end of its travel, to ensure that the end of travel has been reached.

(11) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TABLE DOWN button until the base function reaches the end of its travel.

(12) Check the voltage reading of the multimeter. The voltage reading must be between 0.5 - 1.0 VDC. The difference between the voltage measured in step 6 and the voltage measured in this step must be at least 2.5 VDC. If not, repeat steps 4 thru 12. If problem persists, base transducer may be malfunctioning.

(13) Remove positive and negative probes of multimeter from Test Points 5 and 6.

(14) Raise the bellows assembly (Refer to para 4-3).

(15) Perform a PC control board calibration (Refer to para 4-33).

(16) Install electrical cover (Refer to para 4-4).

4-11. Base Reducer Assembly Removal / Disassembly / Assembly / Installation

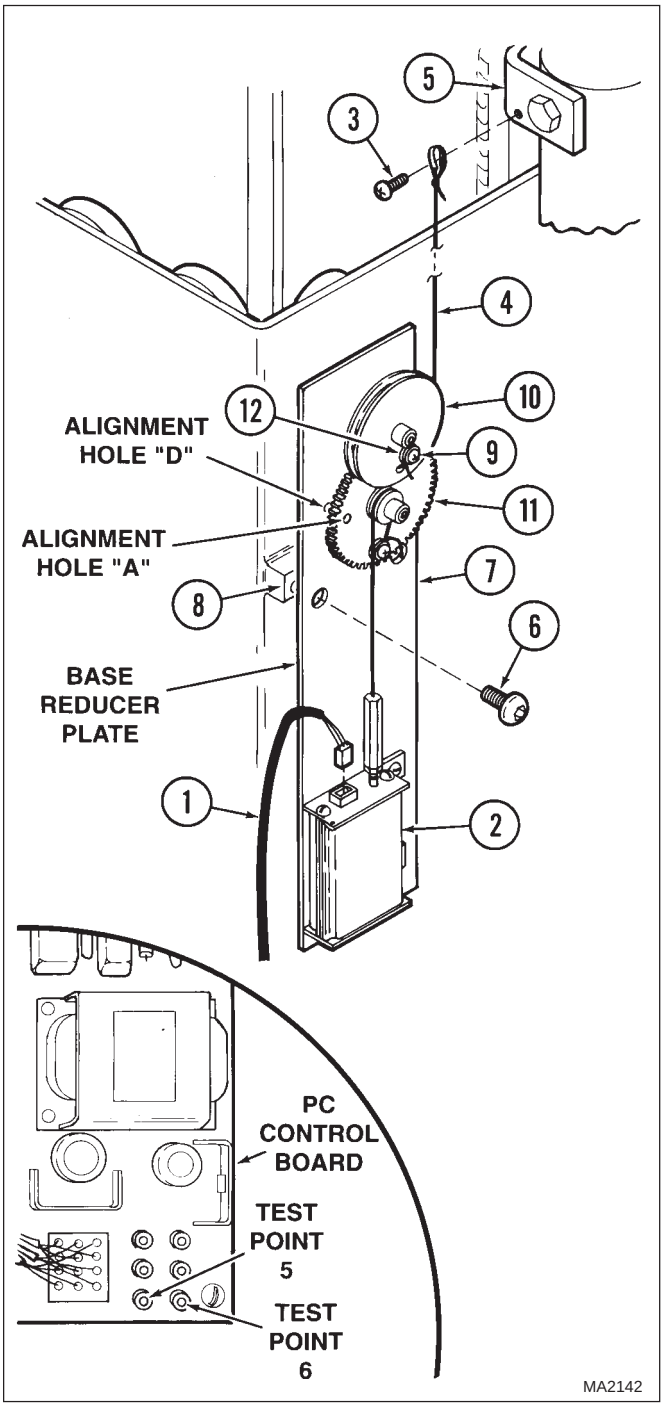

Figure 4-16. Base Reducer Removal / Installation

A. Removal

(1) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TABLE UP button until the base function reaches the end of its travel.

(2) Lower the bellows assembly (Refer to para 4-3).

(3) Disconnect wire harness (1, Figure 4-16) from base transducer (2).

(4) Remove screw (3) and cable assembly (4) from middle slide (5).

(5) Remove two screws (6) and base reducer assembly (7) from outer slide (8).

B. Disassembly

(1) While holding cable/turnbuckle assembly (1, Figure 4-17), loosen nut (2).

(2) Unscrew cable/turnbuckle assembly (1) from transducer rod (3).

NOTE
Steps 3 and 4 only need to be performed if the base reducer plate is being replaced. If replacing gearing or cabling only, these steps may be skipped.

(3) Using tape or a sharp object, mark the present position of base transducer (4) on the base reducer plate (5) by tracing the outline of the base transducer mounting brackets.

(4) Remove two screws (6) and base transducer (4) from base reducer plate (5).

(5) Remove screw (7), two washers (8), and separate cable assembly (9) from base capstan (10).

(6) Remove nut (11), shoulder screw (12), base capstan (10), and nylon spacer (13) from base reducer plate (5).

(7) If damaged, place base capstan (10) in a vice, and drive reducer pinion (14) from base capstan with a hammer and punch.

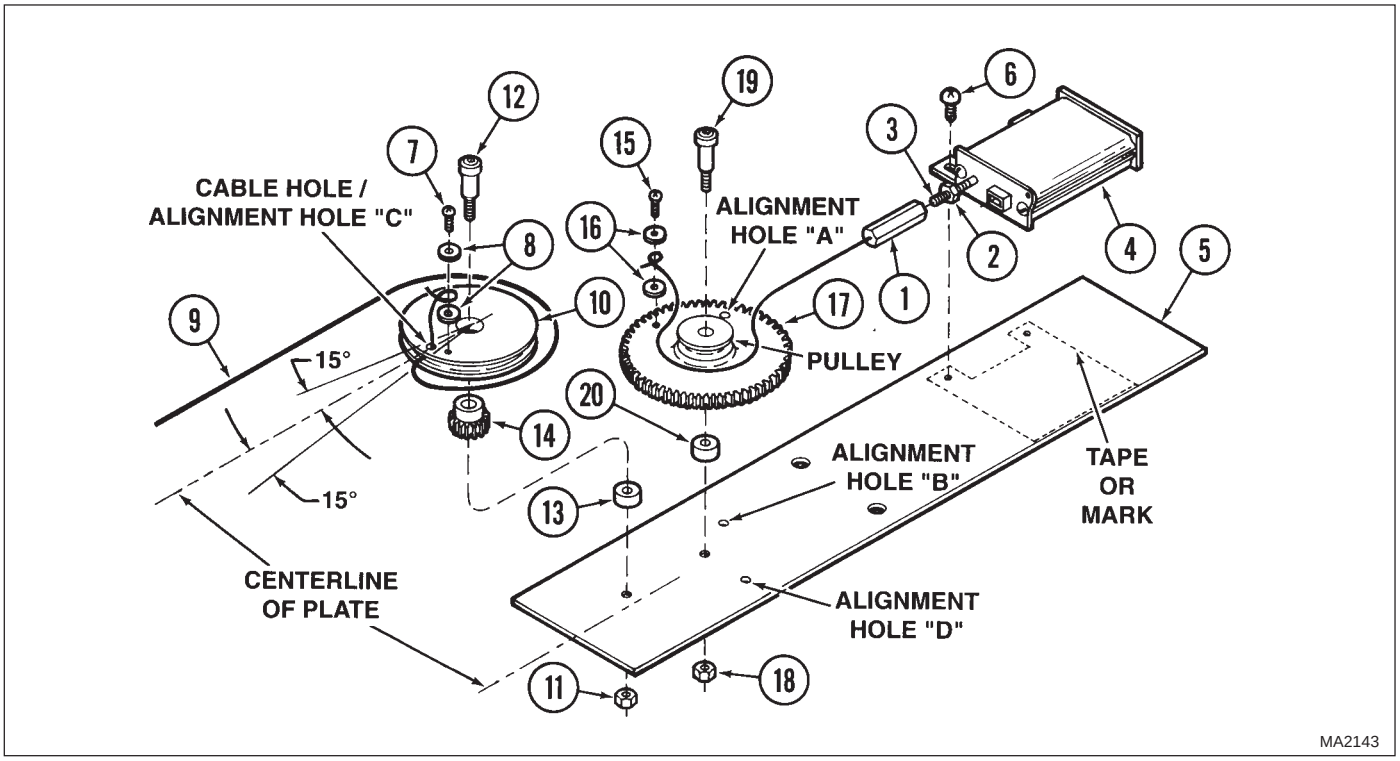

Figure 4-17. Base Reducer Disassembly / Assembly

(8) Remove screw (15), two washers (16), and cable/turnbuckle assembly (1) from base output gear (17).

(9) Remove nut (18), shoulder screw (19), base output gear (17), and nylon spacer (20) from base reducer plate (5).

C. Assembly

(1) If replacing the base reducer plate (5, Figure 4-17), transfer the tape or marks for the base transducer to the new base reducer plate.

(2) Install nylon spacer (20) and base output gear (17) on base reducer plate (5) and secure with shoulder screw (19) and nut (18).

(3) If removed, coat mating surfaces of reducer pinion (14) and base capstan (10) with adhesive (Loctite RC 680).

(4) Using a hammer, lightly tap reducer pinion (14) into base capstan (10).

(5) Align Alignment Hole A in base output gear (17) with Alignment Hole B in base reducer plate (5).

(6) Making sure the alignment achieved in the previous step remains the same, install nylon spacer (13), base capstan (10), and shoulder screw (12) on base reducer plate (5), making sure Alignment Hole C of base capstan is within 15° from the vertical centerline.

(7) Secure base capstan (10) in position with nut (11).

(8) If removed, position base transducer (4) on base reducer plate (5) and align the base transducer with the taping or marks made during removal. Secure the base transducer (4) in position with two screws (6).

(9) Screw nut (2) onto transducer rod (3) fully until the threads run out.

(10) Screw cable/turnbuckle assembly (1) onto transducer rod (3) until half of the transducer rod's threads are covered.

(11) Install two washers (16) and screw (15) on base output gear (17). Do not tighten screw.

(12) Align Alignment Hole A in base output gear (17) with Alignment Hole B in base reducer plate (5).

(13) Making sure the alignment achieved in the previous step remains the same, loop end of cable/turnbuckle assembly (1) over pulley of base output gear (17) and then around screw (15) and in between two washers (16). Tighten screw (15) so the cable of cable/turnbuckle assembly has no slack, but does not pull the transducer rod (3) outward.

(14) Install two washers (8) and screw (7) on base capstan (10). Do not tighten screw.

(15) Thread end of cable assembly (9) thru cable hole in base capstan (10) and wrap it around screw (7). Do not tighten screw.

D. Installation

NOTE
The following step only applies if a new base reducer is being installed.

(1) Loosen screw (9, Figure 4-16) which secures cable assembly (4) to base capstan (10).

NOTE
Allow the bearing in the base actuator spin for several seconds after the base function has reached the end of its travel, to ensure that the end of travel has been reached.

(2) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TABLE UP button until the base function reaches the end of its travel.

NOTE
At the completion of the following step, there should be tension on the cable/turnbuckle assembly.

(3) Turn the base output gear (11) in a clockwise direction until Alignment Hole A in base output gear is aligned with Alignment Hole D in base reducer plate. Secure base output gear in position by inserting a rod or punch thru the alignment holes.

(4) Install base reducer assembly (7) on outer slide (8) and secure with two screws (6).

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NOTE
The metal cable hanger of the cable assembly should be installed so the cable is not interfered with and may hang straight down.

(5) Install loose end of cable assembly (4) on middle slide (5) and secure with screw (3).

(6) Connect wire harness (1) to base transducer (2).

(7) Remove electrical cover (Refer to para 4-4).

(8) Plug the positive probe of the multimeter into Test Point 5 and the negative probe of the multimeter into Test Point 6 of PC control board. See Figure 4-16.

(9) Hold base output gear (11) stationary and remove punch or rod from alignment holes. Then rotate base output gear (11) in a clockwise direction until the multimeter reads 4.5 VDC ± 0.25 VDC. Wrap bottom end of cable assembly (4) around screw (9) and in between two washers (12). Tighten screw (9), ensuring that the multimeter reading does not change.

(10) Refer to Figure 4-16 and check the cable routing. If incorrect, correct and repeat step 9.

NOTE
Steps 1 thru 5 will already be completed and will not need to be performed.

(11) Adjust base transducer (Refer to para 4-10).

4-12. Trendelenburg Actuator Removal / Disassembly / Assembly / Installation

A. Removal

NOTE
If the trendelenburg actuator is being replaced as an assembly, the disassembly/assembly procedure should not be performed. The disassembly/assembly procedure should only be performed if the trendelenburg actuator is being repaired.

(1) Depress the brake pedal to apply the brakes. See Figure 4-18.

(2) Operate the surgery table to move the foot section of the table top to a horizontal position.

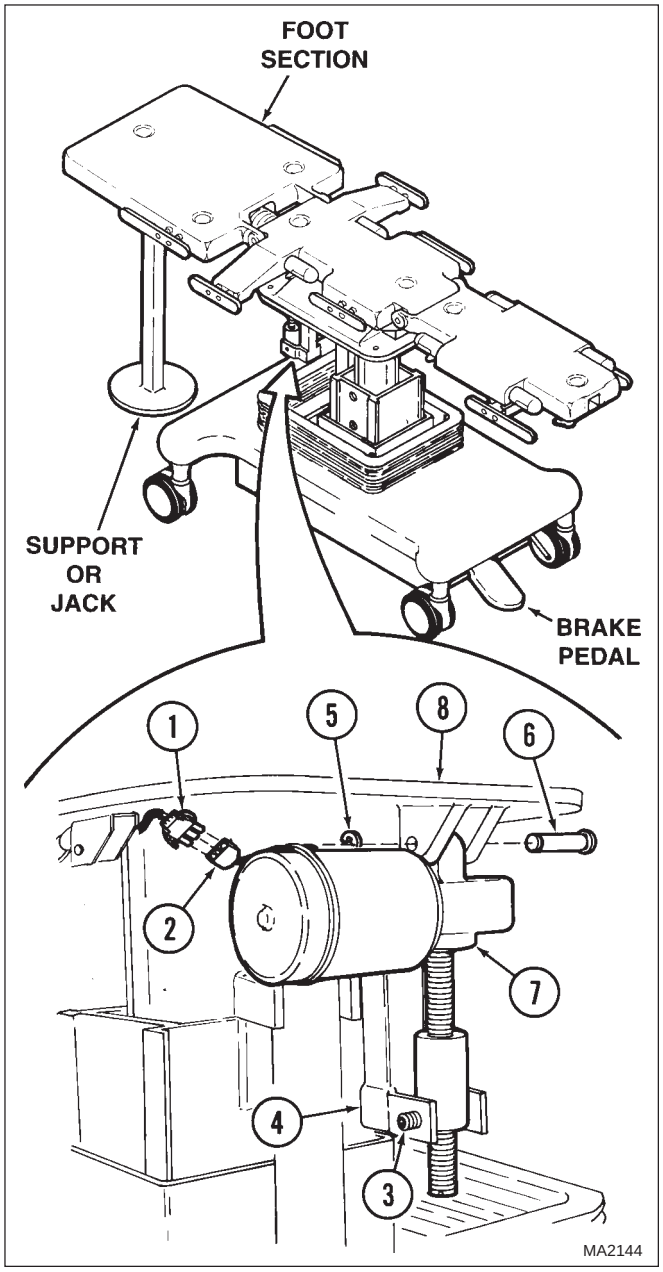

Figure 4-18. Trendelenburg Actuator Removal / Installation

DANGER
Support the foot section of the table top securely. Failure to do so could allow the table top to fall, causing serious personal injury.

NOTE
The support/jack need only support the straight downward weight of the foot and seat sections of the table top. The table top cannot tip sideways.

(3) Support the foot end of the table top by positioning a support or jack under the foot section of the table top. See Figure 4-18.

(4) Disconnect electrical power from surgery table.

(5) Lower bellows assembly (Refer to para 4-3).

(6) Disconnect wire harness (1, Figure 4-18) from trendelenburg actuator wire harness (2).

DANGER
The following step frees the weight of the surgery table from the trendelenburg actuator. Failure to have the foot section of the table top properly supported could result in personal injury.

(7) Loosen or remove two pivot screws (3) until the bottom of the trendelenburg actuator separates from column adapter (4).

(8) Remove two E-rings (5), clevis pin (6), and trendelenburg actuator (7) from trendelenburg plate (8).

B. Disassembly

(1) Remove two nuts (1, Figure 4-19) and motor assembly (2) from actuator mechanism (3).

(2) Remove two shoulder washers (4) from actuator mechanism (3).

(3) Remove spacer (5) and motor coupler (6) from shaft of motor assembly (2).

NOTE
A needle nosed pliers should be used to extract the actuator brake from the actuator mechanism. Grasp the raised round plate of the actuator brake with the pliers and pull.

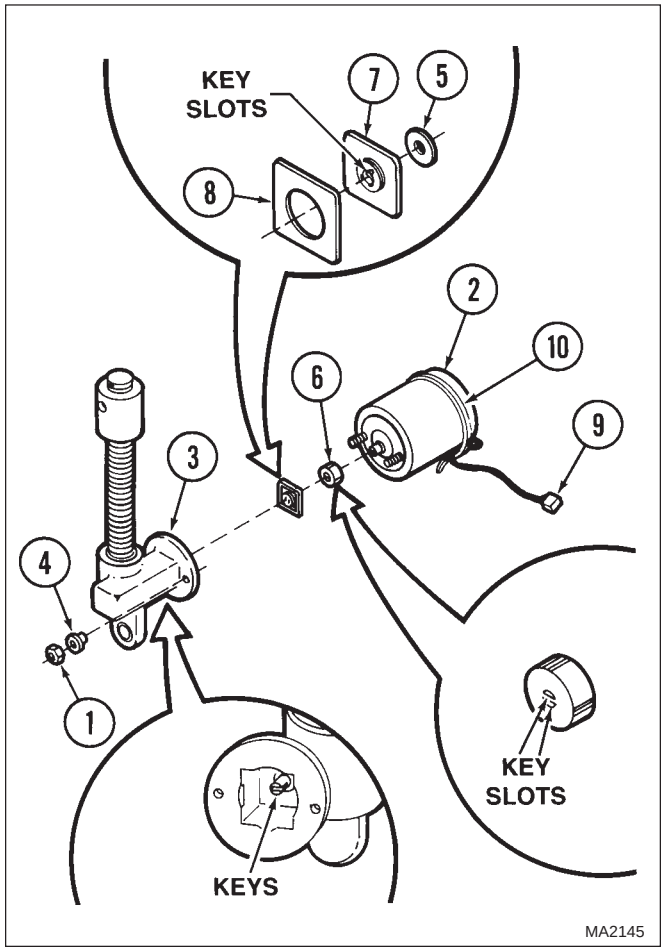

Figure 4-19. Trendelenburg Actuator Disassembly / Assembly

(4) Remove actuator brake (7) and rubber damper (8) from shaft of actuator mechanism (3).

C. Assembly

(1) Position trendelenburg actuator wire harness (9, Figure 4-19) on housing of motor assembly (2) as shown in illustration and secure with cable tie (10).

NOTE
The rubber damper should be installed so its flat side faces the inside of the actuator mechanism. The actuator brake should be installed so its flattest side faces outward. The shaft of the actuator mechanism may be turned with a screwdriver to help align the keys of the actuator mechanism shaft with the key slots in actuator brake.

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(2) Install rubber damper (8), actuator brake (7), and spacer (5) in actuator mechanism (3). Press parts firmly into actuator mechanism to ensure they are seated properly.

(3) Install motor coupler (6) on shaft of motor assembly (2).

(4) Install two shoulder washers (4) in actuator mechanism (3).

NOTE
The alignment in the following step can be difficult and may not always be obtained every time. If the alignment is off, the trendelenburg actuator will make a grinding sound and will not move. To check for proper alignment before installing the actuator, temporarily connect the trendelenburg actuator wire harness to the surgery table. While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TREND or REVERSE TREND button for a few seconds. The trendelenburg actuator should run normally and should not make a grinding sound. If a grinding sound is made, repeat step (5) until proper alignment is achieved.

(5) Align the keys of the actuator mechanism (3) shaft with the key slots of the motor coupler (6) and then install the motor assembly (2) on actuator mechanism (3) and secure with two nuts (1).

D. Installation

(1) Install trendelenburg actuator (7, Figure 4-18) on trendelenburg plate (8) and secure with clevis pin (6) and two E-rings (5).

(2) Coat threads of two pivot screws (3) with permanent thread locking adhesive (Loctite 262).

NOTE
The shaft of the trendelenburg actuator may be rotated to help align it with the column adapter. Rotating the shaft either lengthens or shortens it.

(3) Install the shaft of trendelenburg actuator (7) on column adapter (4) and secure with two pivot screws (3).

(4) Connect trendelenburg actuator wire harness (2) to wire harness (1).

(5) Raise the bellows assembly (Refer to para 4-3).

(6) Connect electrical power to the surgery table.

(7) Remove the support or jack from the foot section of the table top.

4-13. Trendelenburg Transducer Removal / Installation

A. Removal

(1) Lower the bellows assembly (Refer to para 4-3).

(2) Disconnect wire harness (1, Figure 4-20) from trendelenburg transducer (2).

(3) While holding cable/turnbuckle assembly (3), loosen nut (4).

(4) Unscrew cable/turnbuckle assembly (3) from transducer rod (5).

(5) Using a pencil or sharp object, mark the present position of trendelenburg transducer (2) on the transducer mounting plate (6) by tracing the outline of the trendelenburg transducer mounting brackets.

(6) Remove two screws (7) and trendelenburg transducer (2) from trendelenburg mounting plate (6).

(7) Remove nut (4) from transducer rod (5).

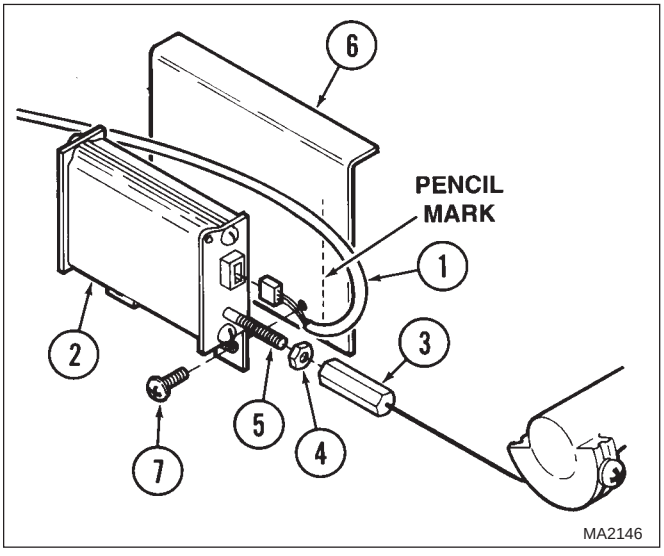

Figure 4-20. Trendelenburg Transducer Removal / Installation

B. Installation

(1) Screw nut (4) onto transducer rod (5) fully until the threads run out.

(2) Position trendelenburg transducer (2) on trendelenburg mounting plate (6) and align the trendelenburg transducer with the pencil marks made during removal. Secure the trendelenburg transducer (2) in position with two screws (7).

(3) Screw cable/turnbuckle assembly (3) onto transducer rod (5) until half of the transducer rod's threads are covered.

(4) Connect wire harness (1) to trendelenburg transducer (2).

(5) Adjust the trendelenburg transducer (Refer to para 4-14).

4-14. Trendelenburg Transducer Adjustment

A. Adjustment

(1) Remove electrical cover (Refer to para 4-4).

(2) Lower the bellows assembly (Refer to para 4-3).

(3) Plug the positive probe of the multimeter into Test Point 1 and the negative probe of the multimeter into Test Point 6 of PC control board. See Figure 4-21.

NOTE
Allow the bearing in the trendelenburg actuator to spin for a few seconds after the trendelenburg function has reached the end of its travel, to ensure that the end of travel has been reached.

(4) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the REVERSE TREND button until the trendelenburg function reaches the end of its travel.

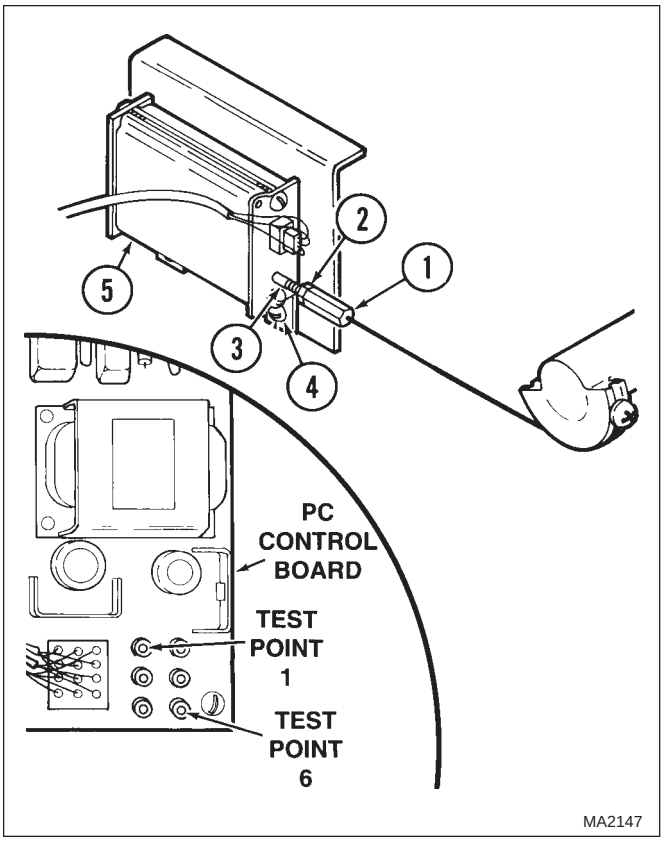

Figure 4-21. Trendelenburg Transducer Adjustment

NOTE
If trendelenburg transducer adjustment procedure is being performed as a result of installing a new trendelenburg transducer, step 5 will already be completed and will not need to be performed.

(5) While holding cable/turnbuckle assembly (1, Figure 4-21), loosen nut (2).

NOTE
The desired setting for the back transducer is 0.5 VDC. The setting cannot be lower than 0.5 VDC but may go up to 1.0 VDC.

(6) Screw in or unscrew cable/turnbuckle assembly (1) until the multimeter reads 0.5 VDC + 0.5 VDC/-0.0 VDC. If the proper voltage setting is obtained, proceed to step 10. If the cable/ turnbuckle assembly (1) runs out of adjustment before the proper voltage setting is obtained, perform steps 7 thru 9. If the proper voltage setting still cannot be obtained, the cable/ turnbuckle assembly (1) is stretched and must

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be shortened slightly or a knot in cable has loosened and must be retied.

(7) Screw or unscrew the cable/turnbuckle assembly (1) until it is centered on the threads of the transducer rod (3).

NOTE
Slide the trendelenburg transducer to the right if the voltage setting cannot be adjusted low enough. Slide the trendelenburg transducer to the left if the voltage setting cannot be adjusted high enough.

(8) Loosen two screws (4) and slide the trendelenburg transducer (5) to the left or right as necessary.

(9) Tighten two screws (4). Repeat step 6.

(10) While holding cable/turnbuckle assembly (1), tighten nut (2), making sure the voltage setting does not change.

NOTE
Allow the bearing in the trendelenburg actuator to spin for a few seconds after the trendelenburg function has reached the end of its travel, to ensure that the end of travel has been reached.

(11) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TREND button until the trendelenburg function reaches the end of its travel.

(12) Check the voltage reading of the multimeter. The voltage reading must be between 3.0 - 4.75 VDC. The difference between the voltage measured in step 6 and the voltage measured in this step must be at least 2.5 VDC. If not, repeat steps 4 thru 12. If problem persists, trendelenburg transducer may be malfunctioning.

(13) Remove positive and negative probes of multimeter from Test Points 1 and 6.

(14) Raise the bellows assembly (Refer to para 4-3).

(15) Perform a PC control board calibration (Refer to para 4-33).

(16) Install electrical cover (Refer to para 4-4).

4-15. Foot Actuator Removal / Disassembly / Assembly / Installation

NOTE
If the foot actuator is being replaced as an assembly, the disassembly/assembly procedures should not be performed. The disassembly/assembly procedure should only be performed if the foot actuator is being repaired.

A. Removal

(1) If possible, operate the surgery table to raise the foot section and table top as high as they will go.

(2) Disconnect all electrical power from the surgery table.

(3) Remove two screws (1, Figure 4-22) and partially separate foot actuator cover (2) from foot casting (3).

(4) Disconnect coil cord wire harness (4) from foot actuator wire harness (5) and remove foot actuator cover (2).

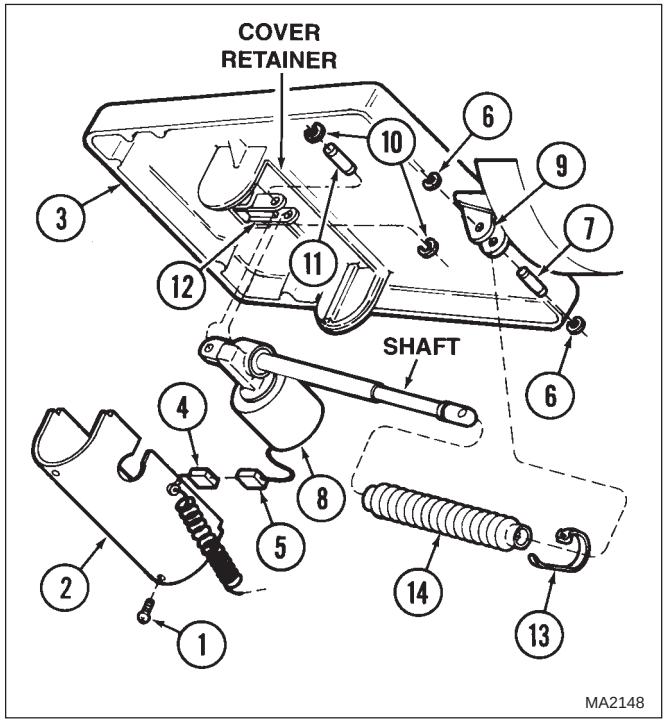

Figure 4-22. Foot Actuator Removal / Installation

CAUTION
Do not lower the foot casting or allow the foot casting to fall downward. If the foot casting goes down past -85° from the horizontal plane, damage to the foot transducer and/or cable/ turnbuckle assembly will result.

NOTE
Raising the foot casting upward slightly will remove the tension from the clevis pin, making removal of the clevis pin much easier.

(5) While supporting the foot casting (3), remove two E-rings (6), clevis pin (7), and separate the shaft of foot actuator (8) from foot clevis (9). Let the foot actuator hang from its remaining mounting hardware.

(6) Raise the foot casting (3) as far as it will go and securely tie the foot casting in this position with straps or ropes.

(7) Remove two E-rings (10), clevis pin (11), and foot actuator (8) from foot clevis mount (12).

(8) Cut cable tie (13) and remove foot bellows (14) from shaft of foot actuator (8).

B. Disassembly

(1) Remove two nuts (1, Figure 4-23) and motor assembly (2) from actuator mechanism (3).

(2) Remove two shoulder washers (4) from actuator mechanism (3).

(3) Remove spacer (5) and motor coupler (6) from shaft of motor assembly (2).

NOTE
A needle nose pliers should be used to extract the actuator brake from the actuator mechanism. Grasp the raised round plate of the actuator brake with the pliers and pull.

(4) Remove actuator brake (7) and rubber damper (8) from shaft of actuator mechanism (3).

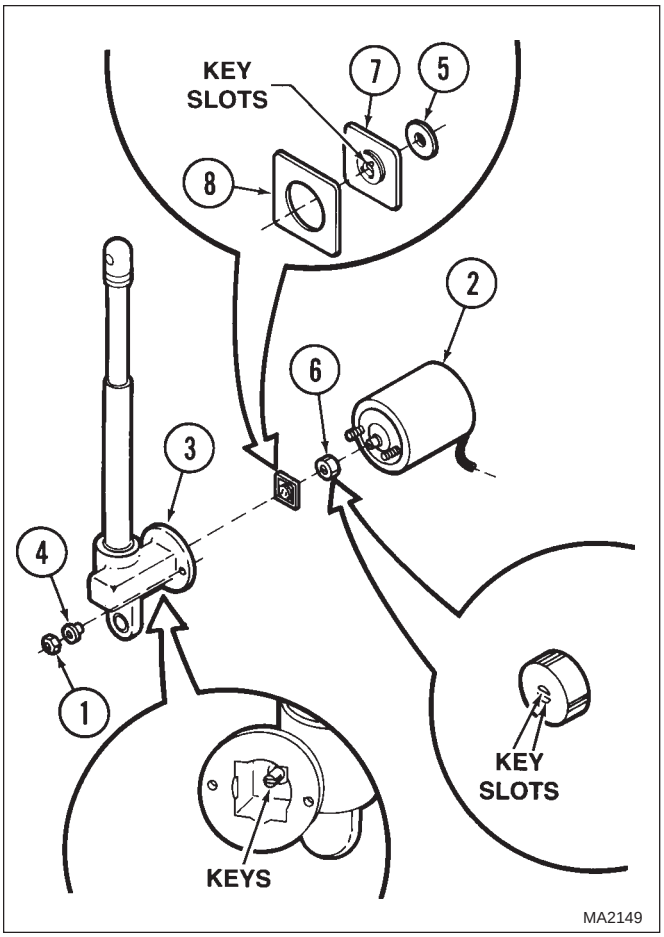

Figure 4-23. Foot Actuator Disassembly / Assembly

C. Assembly

NOTE
The rubber damper should be installed so its flat side faces the inside of the actuator mechanism. The actuator brake should be installed so its flattest side faces outward. The shaft of the actuator mechanism may be turned with a screwdriver to help align the keys of the actuator mechanism shaft with the key slots in actuator brake.

(1) Install rubber damper (8, Figure 4-23), actuator brake (7), and spacer (5) in actuator mechanism (3). Press parts firmly into actuator mechanism to ensure they are seated properly.

(2) Install motor coupler (6) on shaft of motor assembly (2).

(3) Install two shoulder washers (4) in actuator mechanism (3).

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NOTE
The alignment in the following step can be difficult and may not always be obtained every time. If the alignment is off, the foot actuator will make a grinding sound and will not move. To check for proper alignment before installing foot actuator, temporarily connect the foot actuator wire harness to the surgery table. While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the FOOT DOWN button for a few seconds. The foot actuator should run normally and should not make a grinding sound. If a grinding sound is made, repeat step (4) until proper alignment is achieved.

(4) Align the keys of the actuator mechanism (3) shaft with the key slots of the motor coupler (6) and then install the motor assembly (2) on actuator mechanism (3) and secure with two nuts (1).

D. Installation

(1) Slide foot bellows (14, Figure 4-22) over shaft of foot actuator (8) so the edge of the foot bellows fits just over the lip on the foot actuator shaft.

NOTE
The cable tie should be installed so that it rests in the groove on the foot actuator shaft. This will secure the foot bellows from sliding.

(2) Secure foot bellows (14) to shaft of foot actuator (8) with a cable tie (13). Trim excess cable tie.

(3) Install foot actuator (8) on foot clevis mount (12) and secure with clevis pin (11) and two E-rings (10).

CAUTION
Do not lower the foot casting or allow the foot casting to fall downward. If the foot casting goes down past -85° from the horizontal plane, damage to the foot transducer and/or cable/turnbuckle assembly may result.

(4) Remove the straps or ropes and lower the foot casting (3) until the shaft of the foot actuator (8) can be positioned on the foot clevis (9).

(5) Secure the shaft of the foot actuator (8) to foot clevis (9) with clevis pin (7) and two E-rings (6).

(6) Position foot actuator cover (2) close to foot casting (3) and connect foot actuator wire harness (5) to coil cord wire harness (4).

CAUTION
Make sure the foot actuator cover fits over foot bellows properly and does not pinch or tear the foot bellows. Also, both sides of the foot actuator cover should fit inside the cover retainers to prevent it from being deformed when screws are installed and/or to prevent it from being improperly seated. Failure to follow this caution could result in equipment damage.

(7) Install foot actuator cover (2) on foot casting (3) and secure with two screws (1).

(8) Connect electrical power to the surgery table.

4-16. Foot Transducer Removal / Installation

NOTE
The following step should be performed to obtain access to the foot transducer. The procedure may be performed from either side of the table, however, the illustration shown is from the patients right side of the surgery table.

(1) Press the ENABLE button and then press the LATERAL TILT LEFT or LATERAL TILT RIGHT button until the lateral tilt function reaches the end of its travel.

(2) Disconnect wire harness (1, Figure 4-24) from foot transducer (2).

(3) While holding cable/turnbuckle assembly (3), loosen nut (4).

(4) Unscrew cable/turnbuckle assembly (3) from transducer rod (5).

(5) Cut cable tie (6) which secures wire harnesses (1 and 7) to foot transducer (2).

(6) Using a pencil or sharp object, mark the present position of foot transducer (2) on the seat casting (8) by tracing the outline of the foot transducer mounting brackets.

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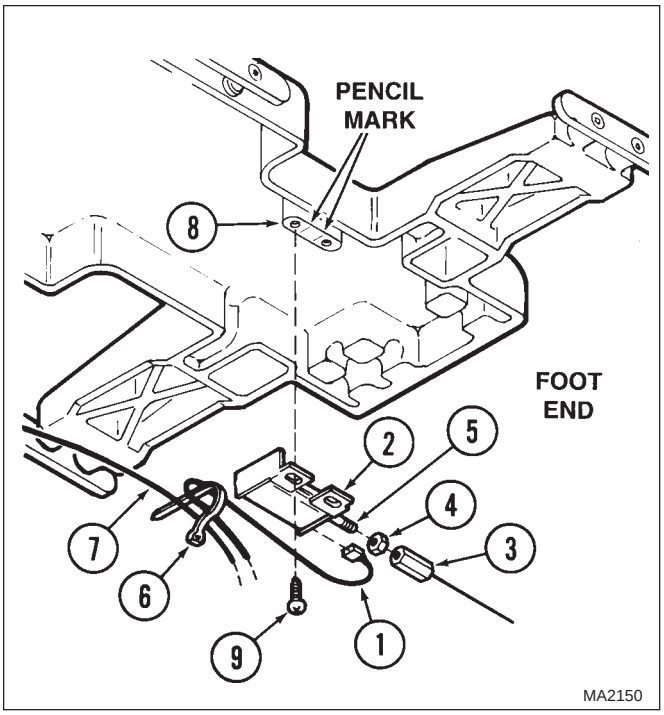

Figure 4-24. Foot Transducer Removal / Installation

(7) Remove two screws (9) and foot transducer (2) from seat casting (8).

(8) Remove nut (4) from transducer rod (5).

B. Installation

(1) Screw nut (4) onto transducer rod (5) fully until the threads run out.

(2) Position foot transducer (2) on seat casting (8) and align the foot transducer with the pencil marks made during removal. Secure the foot transducer (2) in position with two screws (9).

(3) Secure wire harnesses (1 and 7) to foot transducer (2) with cable tie (6).

(4) Screw cable/turnbuckle assembly (3) onto transducer rod (5) until half of the transducer rod's threads are covered.

(5) Connect wire harness (1) to foot transducer (2).

(6) Adjust the foot transducer (Refer to para 4-17).

4-17. Foot Transducer Adjustment

(1) Remove electrical cover (Refer to para 4-4).

(2) Plug the positive probe of the multimeter into Test Point 2 and the negative probe of the multimeter into Test Point 6 of PC control board. See Figure 4-25.

NOTE
If foot transducer adjustment procedure is being performed as a result of installing a new foot transducer, steps (3) and (5) will already be completed and will not need to be performed.

The following step should be performed to obtain access to the foot transducer. The procedure may be performed from either side of the table, however, the illustration shown is from the patients right side of the surgery table.

(3) Press the ENABLE button and then press the LATERAL TILT LEFT button or the LATERAL TILT RIGHT until the lateral tilt function reaches the end of its travel.

NOTE
Allow the bearing in the foot actuator to spin for a few seconds after the foot function has reached the end of its travel, to ensure that the end of travel has been reached.

(4) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the FOOT UP button until the foot function reaches the end of its travel.

(5) While holding cable/turnbuckle assembly (1, Figure 4-25), loosen nut (2).

NOTE
The desired setting for the foot transducer is 0.5 VDC. The setting cannot be lower than 0.5 VDC but may go up to 1.0 VDC.

(6) Screw in or unscrew cable/turnbuckle assembly (1) until the multimeter reads 0.5 VDC + 0.5 VDC/-0.0 VDC. If the proper voltage setting is obtained, proceed to step 10. If the cable/ turnbuckle assembly (1) runs out of adjustment before the proper voltage setting is obtained, perform steps 7 thru 9. If the proper voltage setting can still not be obtained, the cable/

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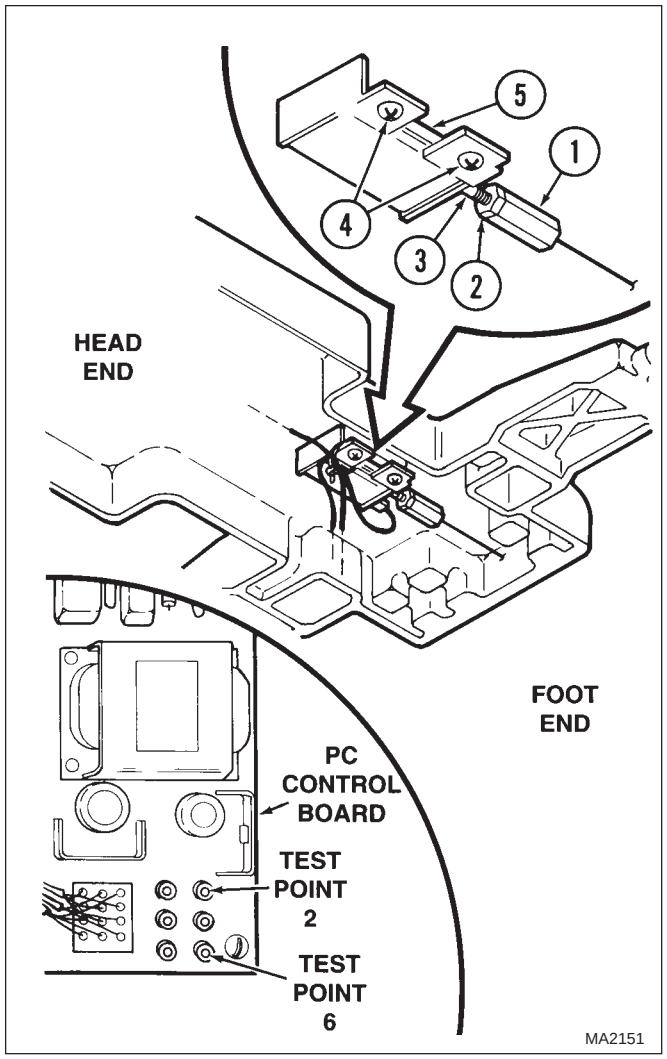

Figure 4-25. Foot Transducer Adjustment

turnbuckle assembly (1) is stretched and must be shortened slightly or a knot in cable has loosened and must be retied.

(7) Screw or unscrew the cable/turnbuckle assembly (1) until it is centered on the threads of the transducer rod (3).

NOTE
Slide the foot transducer toward the foot end of the surgery table if the voltage setting cannot be adjusted low enough. Slide the foot transducer to the head end of the surgery table if the voltage setting cannot be adjusted high enough.

(8) Loosen two screws (4) and slide the foot transducer (5) toward the head end or foot end of the surgery table as determined necessary.

(9) Tighten two screws (4). Repeat step 6.

(10) While holding cable/turnbuckle assembly (1), tighten nut (2), making sure the voltage setting does not change.

NOTE
Allow the bearing in the foot actuator to spin for a few seconds after the foot function has reached the end of its travel, to ensure that the end of travel has been reached.

(11) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the FOOT DOWN button until the foot function reaches the end of its travel.

(12) Check the voltage reading of the multimeter. The voltage reading must be between 3.0 - 4.75 VDC. The difference between the voltage measured in step 6 and the voltage measured in this step must be at least 2.5 VDC. If not, repeat steps 4 thru 12. If problem persists, foot transducer may be malfunctioning.

(13) Remove positive and negative probes of multimeter from Test Points 2 and 6.

(14) Perform a PC control board calibration (Refer to para 4-33).

(15) Install electrical cover (Refer to para 4-4).

4-18. Lateral Tilt Motor and / or Drive Components Removal / Installation

A. Removal

(1) Press the ENABLE button and then press the FOOT UP button until the foot function reaches the end of its travel. Press the BACK UP button until the back function reaches the end of its travel. Press the TABLE DOWN button until the base function reaches the end of its travel.

(2) Disconnect all electrical power from the surgery table.

(3) Lower the bellows assembly (Refer to para 4-3).

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(4) Remove screw (1, Figure 4-26) and separate wire clip (2) and coil cord wire harness (3) from trendelenburg plate (4).

(5) Tag and disconnect coil cord wire harness (3) from table wire harness (5).

CAUTION
Do not lower the foot casting or allow the foot casting to fall downward. If the foot casting goes down past -85° from the horizontal plane, damage to the foot transducer and/or cable/ turnbuckle assembly will result.

NOTE
Raising the foot casting upward slightly will remove the tension from the clevis pin, making removal of the clevis pin much easier.

(6) While supporting the foot casting (6), remove two E-rings (7), clevis pin (8), and separate the shaft of foot actuator (9) from foot clevis (10). Let the foot actuator hang from its remaining mounting hardware.

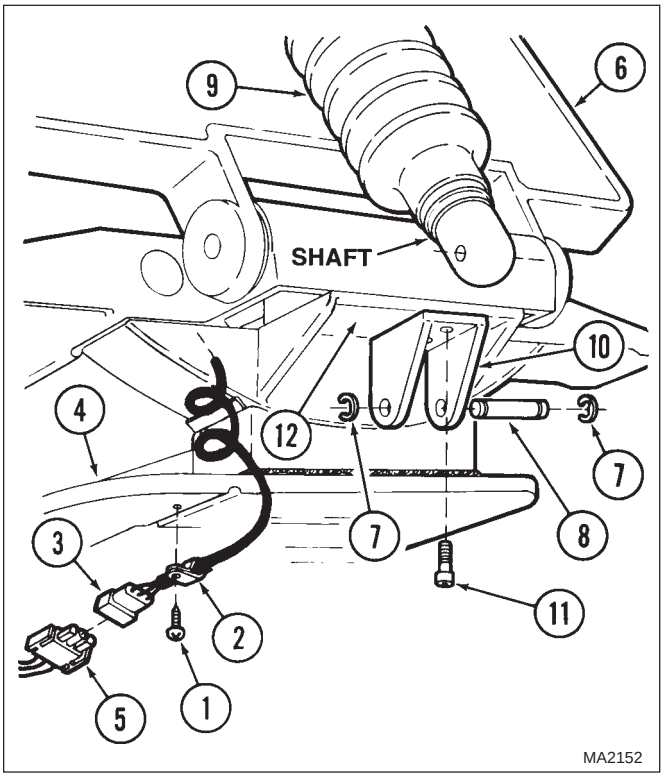

Figure 4-26. Foot Actuator Disconnection

(7) Raise the foot casting (6) as far as it will go and securely tie the foot casting in this position with straps or ropes.

(8) Remove two screws (11) and foot clevis (10) from seat casting (12).

(9) Remove the back cover (Refer to para 4-2).

CAUTION
Do not lower the back casting or let the back casting fall downward. If the back casting goes down past the horizontal plane, damage to the back transducer and/or cable/turnbuckle assembly will result.

(10) While supporting the back casting (1, Figure 4-27), remove two E-rings (2), clevis pin (3), and separate the shaft of back actuator (4) from outer tube weldment (5). Let the back actuator hang from its remaining mounting hardware.

(11) Raise the back casting (1) as far as it will go and securely tie the back casting in this position with straps or ropes.

(12) Remove two E-rings (6), clevis pin (7), two plastic spacers (8), and back actuator (4) from back clevis (9). Lower the back actuator onto the base of the surgery table.

(13) Remove hole plug (10) from access hole in trendelenburg plate (11).

NOTE
Access to the inside screw (12) can be obtained thru the access hole. Early units do not have an access hole. A ball head Allen Wrench will be needed to remove the inside screw (12) on early units.

(14) Remove two screws (12) and back clevis (9) from seat casting (13).

(15) Cut cable tie (1, Figure 4-28) which secures wire harness (2) to back transducer (3).

(16) Cut cable tie (4) which secures wire harnesses (2 and 5) to foot transducer (6).

(17) Tag and disconnect wire harness (2) from back transducer (3).

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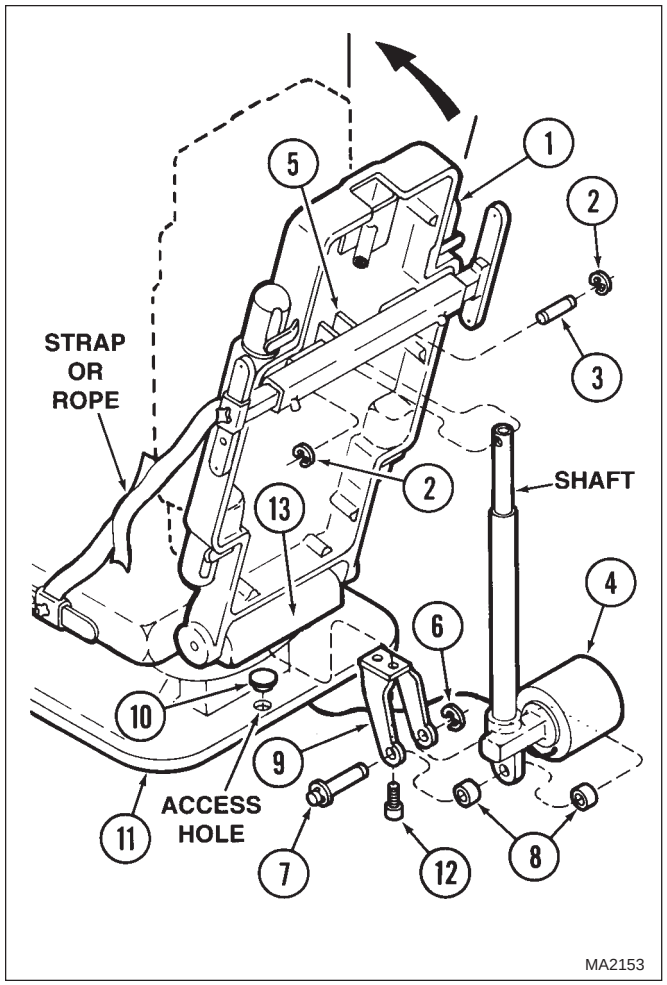

Figure 4-27. Back Actuator Disconnection

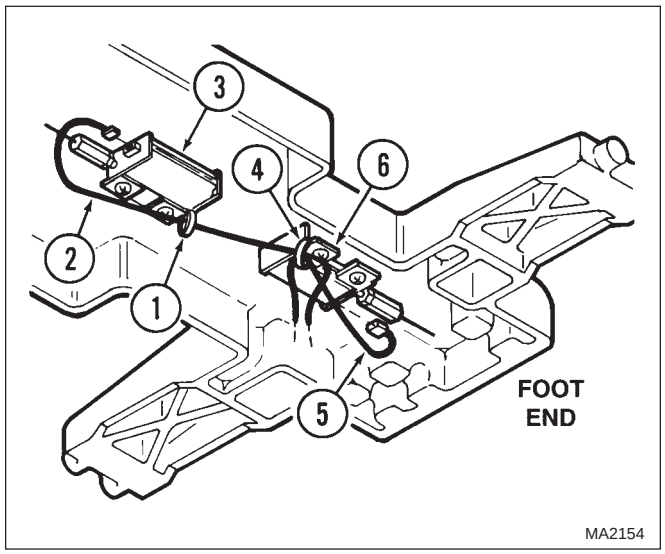

Figure 4-28. Disconnecting Wire Harnesses

(18) Tag and disconnect wire harness (5) from foot transducer (6).

(19) Remove four screws (1, Figure 4-29) which secures the table top (2) to lateral tilt blocks (3).

DANGER

The table top is no longer secured, except for four locator pins. When the table top is lifted, it will be free to move. Failure to have an assistant properly control the table top could result in serious personal injury.

(20) While an assistant slightly raises the foot end of the table top, remove screw (4) and two ground wires (5) from seat casting of table top (2).

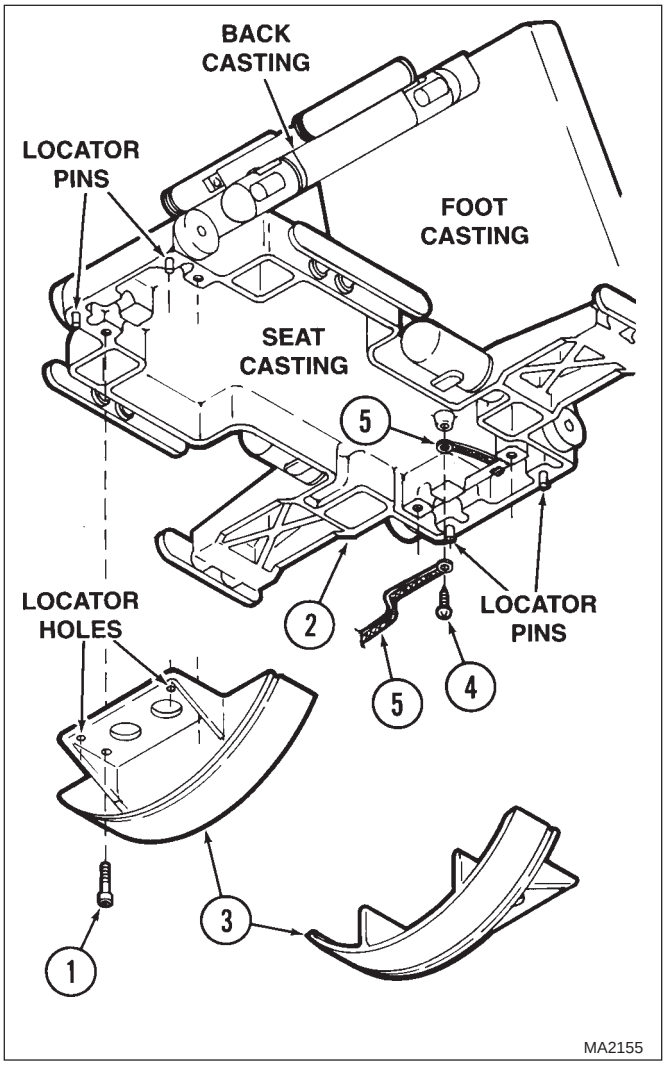

Figure 4-29. Table Top Removal

DANGER
The table top is very heavy. Use an assistant to help remove the table top. Use proper lifting techniques to prevent back strain.

CAUTION
Make sure the foot casting and the back casting remain in the folded up position when the table top is being removed. Failure to do so could result in damage to the foot or back transducers or their cable/turnbuckle assemblies.

(21) With the help of an assistant, remove table top (2) from lateral tilt blocks (3). Lower table top to the floor.

(22) Remove two screws (1, Figure 4-30) and lateral tilt cover (2) from trendelenburg plate (3).

(23) Remove one lateral tilt block (4) from each wheel housing (5).

(24) Tag and disconnect two wire harnesses (6) from limit switches (7).

(25) Tag and disconnect wire harness (8) from lateral tilt transducer (9).

(26) Cut cable tie (10) which secures wire harness (8) to lateral tilt transducer (9).

(27) Loosen setscrew (11) in each wheel housing (5).

(28) Remove two screws (12), wheel housing (5), and wheel housing seal (13) from each end of trendelenburg plate (3).

(29) Remove two screws (1, Figure 4-31) and allow nut guide (2) to separate from lead nut (3).

(30) Loosen setscrew (4) in each pinion gear (5).

(31) Remove pinion gear (5) and key (6) from each end of drive shaft (7).

(32) If damaged, remove gear roller (8) from each pinion gear (5).

(33) Remove two screws (9) and partially separate

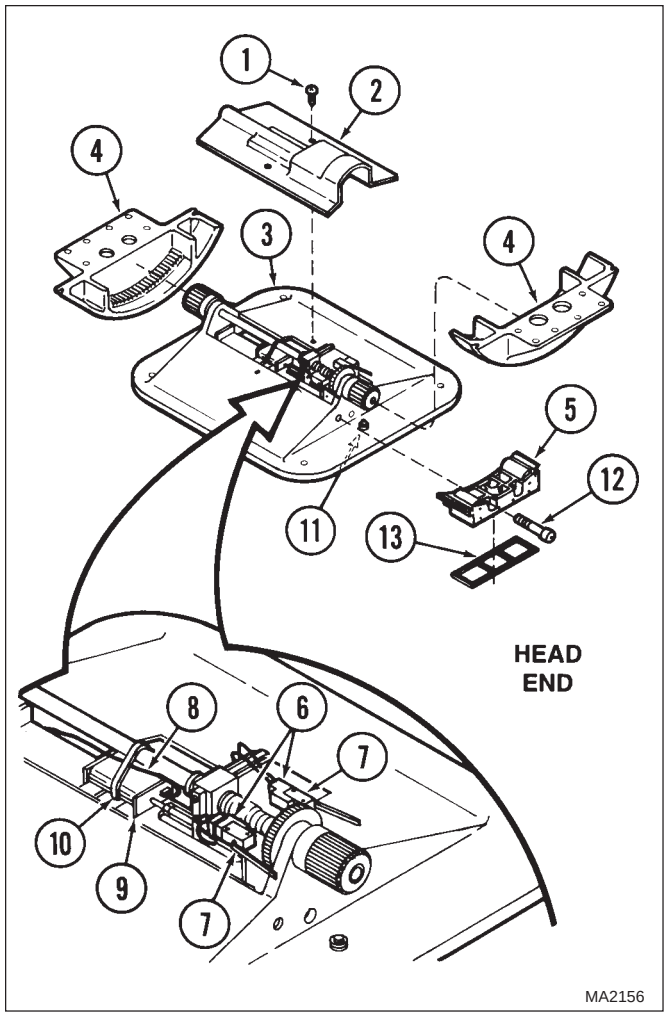

Figure 4-30. Wheel Housing Removal

transducer plate (10) from trendelenburg plate (11).

(34) Cut cable tie (12) which secures wires to connector.

(35) Pull connector and wires thru the wire slot in transducer plate (10) and remove the transducer plate.

(36) Cut cable tie (1, Figure 4-32) which secures lateral tilt wire harness (2) to motor housing of lateral tilt drive assembly (3).

(37) Push the lateral tilt drive assembly (3) toward the foot end of the surgery table until the head end of the lateral tilt drive assembly becomes free of trendelenburg plate (4).

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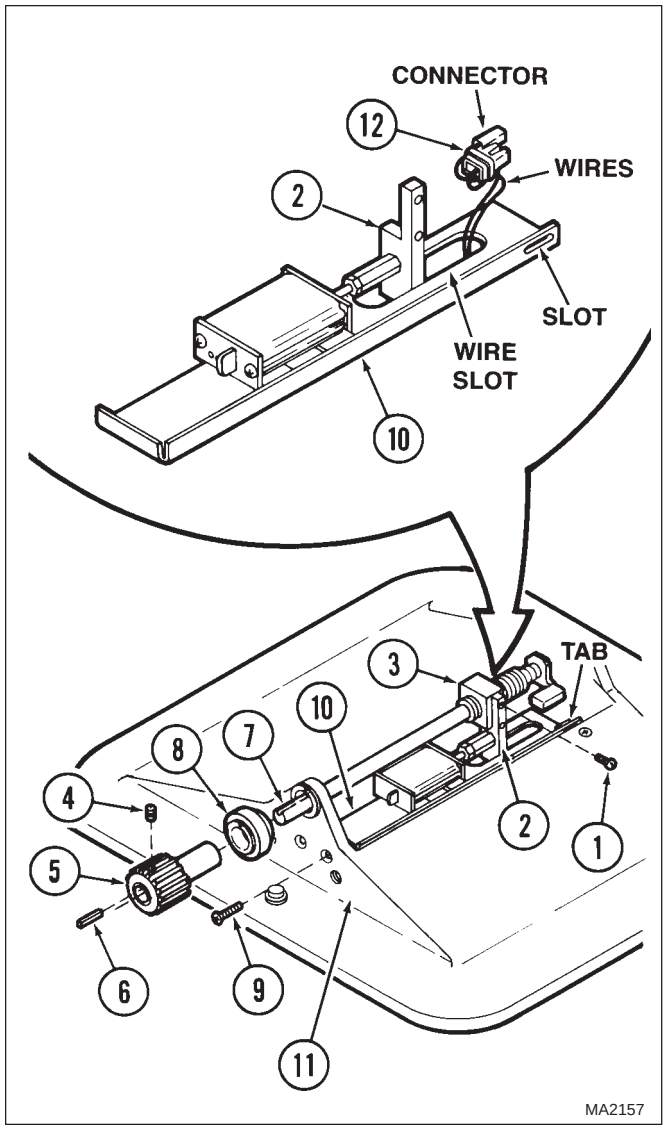

Figure 4-31. Transsducer Plate Removal

(38) Partially separate the lateral tilt drive assembly (3) from trendelenburg plate (4) and then tag and disconnect lateral tilt wire harness (2) from wire harness (5). Remove lateral tilt drive assembly (3) from surgery table.

(39) Unscrew lead nut (1, Figure 4-33) from drive shaft (2).

(40) Loosen setscrew (3) and remove bull gear (4), key (5), and fiber washer (6) from drive shaft (2).

(41) Remove drive shaft (2) from bull gear bracket (7).

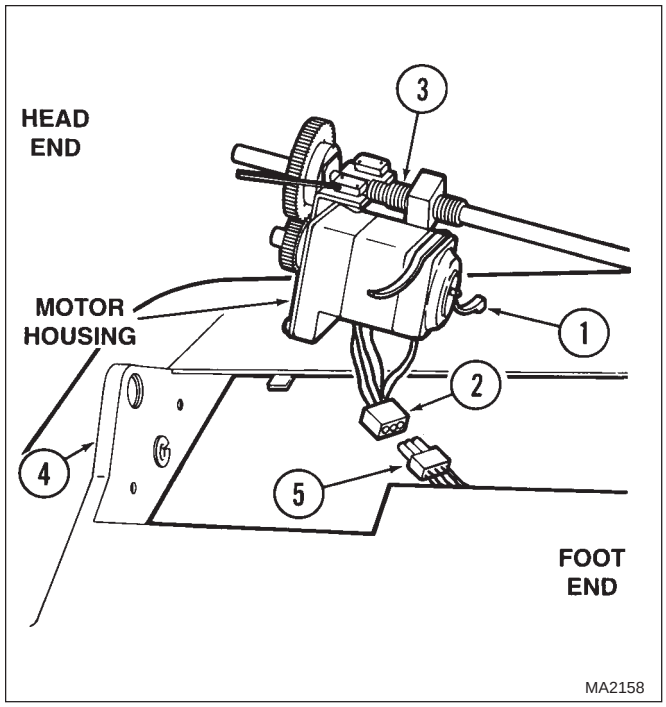

Figure 4-32. Lateral Tilt Drive Assembly Removal

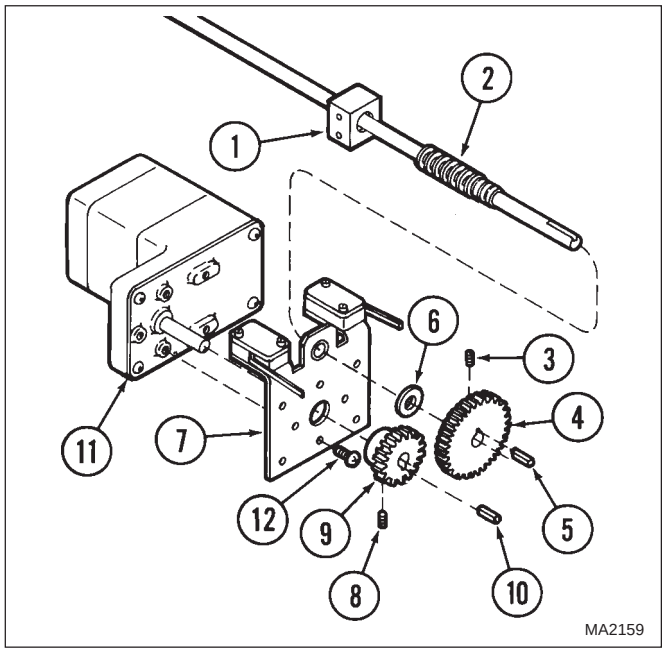

Figure 4-33. Lateral Tilt Drive Assembly Disassembly

(42) Loosen setscrew (8) and remove pinion gear (9) and key (10) from the shaft of lateral tilt motor (11).

(43) Remove five screws (12) and bull gear bracket (7) from lateral tilt motor (11).

B. Installation

(1) Install bull gear bracket (7, Figure 4-34) on lateral tilt motor (11) and secure with five screws (12).

(2) Install key (10) and pinion gear (9) on shaft of lateral tilt motor (11).

CAUTION
When setscrew is tightened, make sure the setscrew is firmly contacting the key. If the key is not secured by the setscrew, the pinion gear will be free to slide back and forth, which could allow the lateral tilt drive assembly to fail.

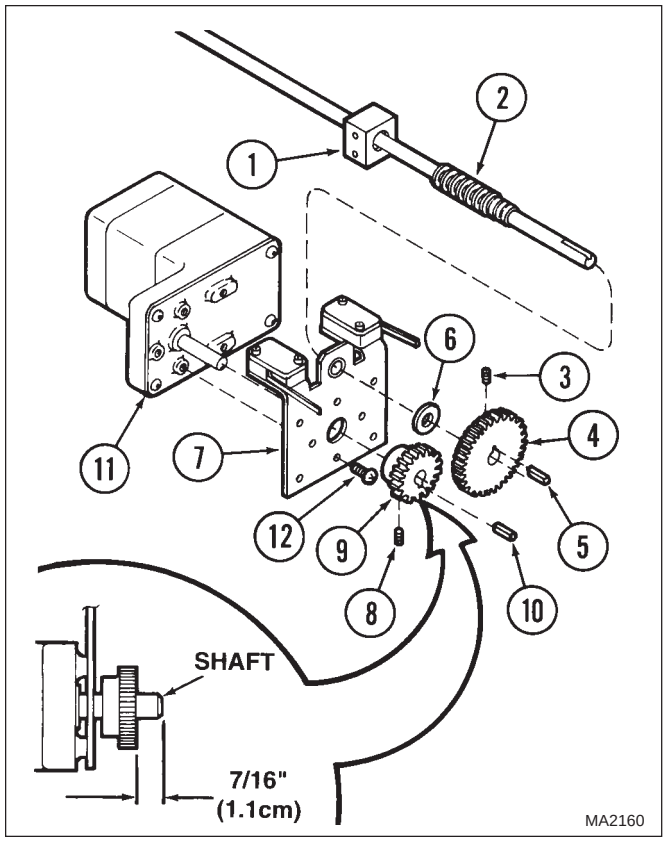

Figure 4-34. Lateral Tilt Drive Assembly Assembly

(3) Slide the pinion gear (9) and key (10) until the outside face of the pinion gear is 7/16 in (1.11 cm) from the end of lateral tilt motor (11) shaft. Secure pinion gear (9) and key (10) in place by tightening setscrew (8).

(4) Install drive shaft (2) in bull gear bracket (7).

(5) Install fiber washer (6), key (5), and bull gear (4) on drive shaft (2).

CAUTION
When setscrew is tightened, make sure the setscrew is firmly contacting the key. If the key is not secured by the setscrew, the bull gear will be free to slide back and forth, which could allow the lateral tilt drive assembly to fail.

NOTE
The bull gear should have a very small amount of play when installed. The outside face of the bull gear should be approximately even with the outside face of pinion gear, thus ensuring good tooth contact.

(6) Push drive shaft (2) firmly against bull gear bracket (7) while from the other direction, lightly pushing bull gear (4) and key (5) against bull gear bracket. Secure bull gear (4) and key (5) in place by tightening setscrew (3).

(7) If removed, screw lead nut (1) onto drive shaft (2) one full turn.

(8) Connect lateral tilt wire harness (2, Figure 4-35) to wire harness (5).

(9) Insert long end of drive shaft into foot end of trendelenburg plate (4).

(10) Insert short end of lateral tilt drive assembly (3) drive shaft into head end of trendelenburg plate (4), making sure the motor shaft is inserted into bearing hole. Push the lateral tilt drive assembly (3) toward head end of surgery table until motor shaft is fully seated in bearing hole.

(11) Secure lateral tilt wire harness (2) to motor housing of lateral tilt drive assembly (3) with cable tie (1).

(12) Feed connector thru wire slot in transducer plate (10, Figure 4-36).

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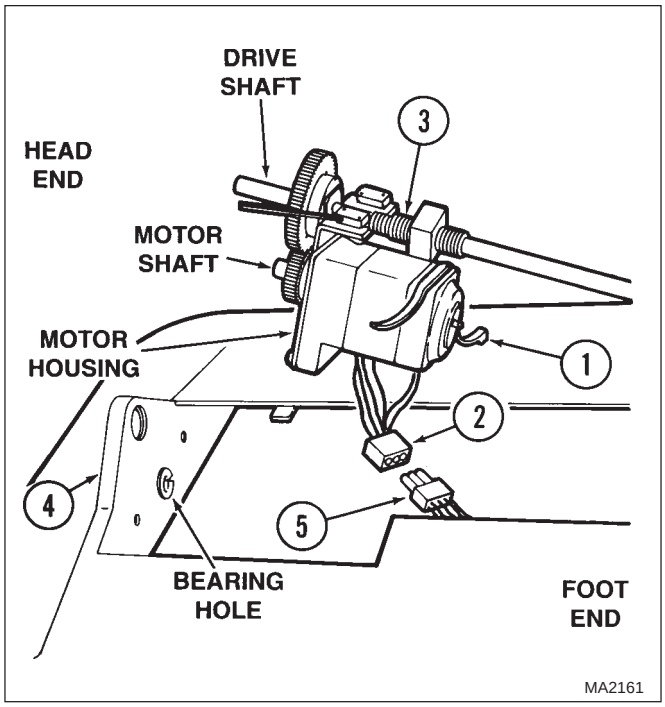

Figure 4-35. Lateral Tilt Drive Assembly Installation

(13) Secure wires to connector with cable tie (12).

(14) Install slot of transducer plate (10) on tab of trendelenburg plate (11) and secure the other end of transducer plate to trendelenburg plate with two screws (9).

(15) If removed, install one gear roller (8) on each pinion gear (5).

NOTE
The keys must remain flush with the ends of the drive shaft when the pinion gears are installed. If the keys slide because the keyway is too large, deform the keyway of the drive shaft with a screwdriver and hammer. This should prevent the keys from sliding when the pinion gears are installed.

(16) Install one key (6) and pinion gear (5) on each end of drive shaft (7).

(17) While pushing firmly against one pinion gear (5), tap lightly on the other pinion gear (5). Switch ends and repeat step until both pinion gears are full seated in trendelenburg plate (11).

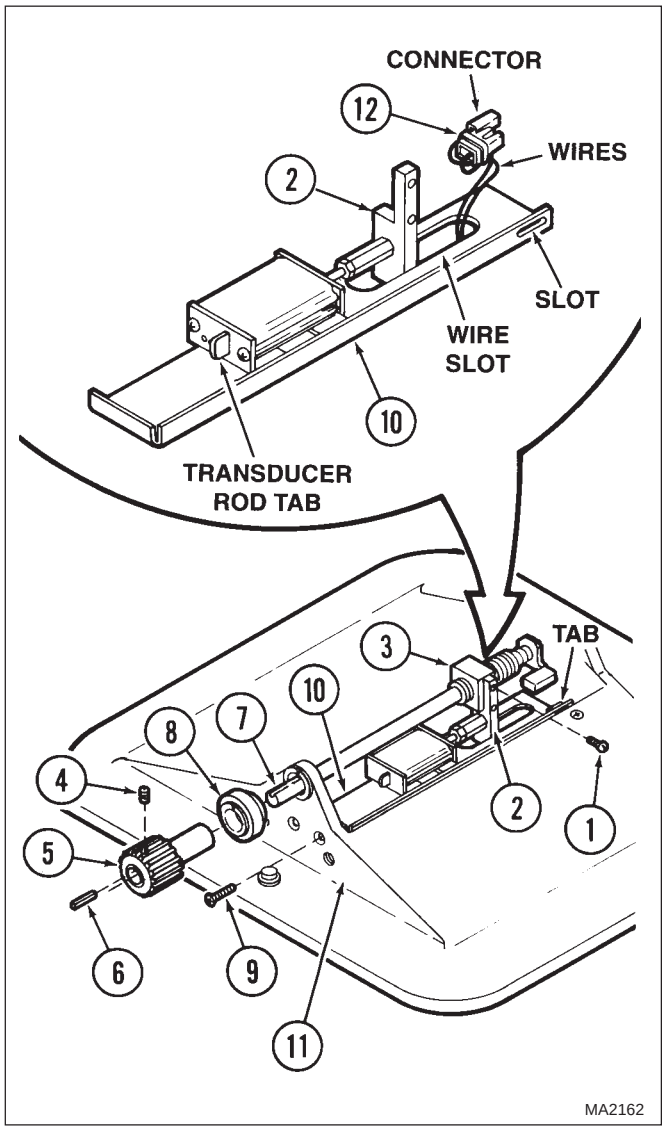

Figure 4-36. Transducer Plate Installation

CAUTION
When setscrews are tightened, make sure the setscrews are firmly contacting the keys. If the keys are not secured by the set-screws, the pinion gears will be free to slide back and forth, which could allow the lateral tilt drive assembly to fail or operate improperly.

(18) Secure each pinion gear (5)and key (6) in position by tightening setscrew (4).

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NOTE
If nut guide is difficult to align with lead nut, unscrew lead nut one full turn or loosen nut and unscrew cable/turnbuckle assembly a couple of turns.

(19) Press on transducer rod tab until nut guide (2) is aligned with lead nut (3) and secure nut guide to lead nut with two screws (1).

(20) Install one wheel housing seal (13, Figure 4-37) and wheel housing (5) on each end of trendelenburg plate (3) and secure with four screws (12). Tighten screws hand tight only.

(21) Connect wire harness (8) to lateral tilt transducer (9).

(22) Secure wire harness (8) to lateral tilt transducer (9) with cable tie (10).

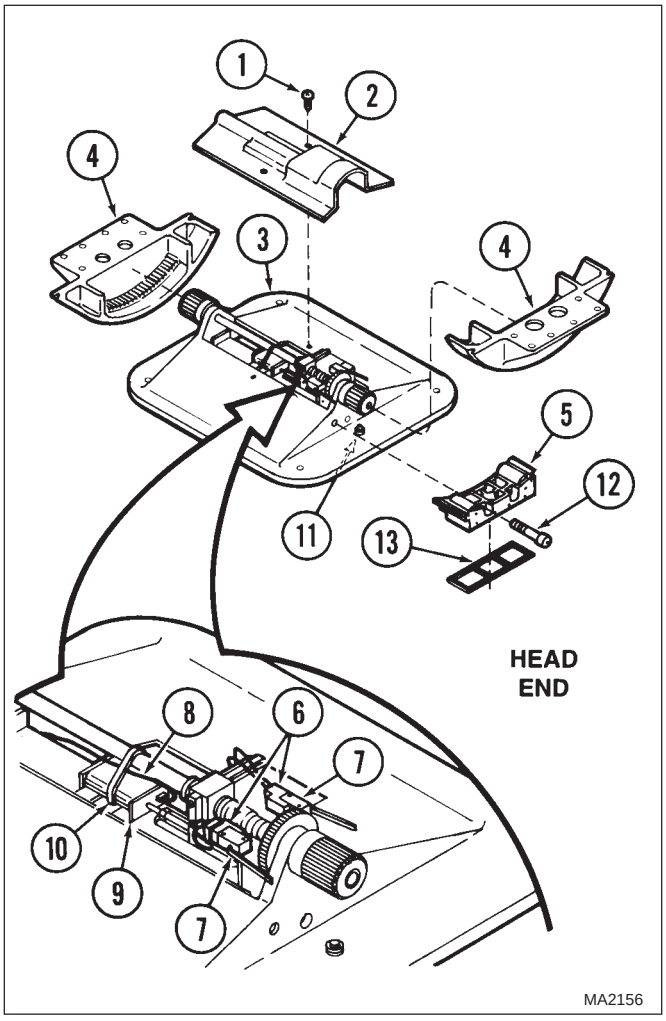

Figure 4-37. Wheel Housing Installation

(23) Connect wire harnesses (6) to limit switches (7).

(24) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the LATERAL TILT LEFT button or LATERAL TILT RIGHT button until the lead nut (1, Figure 4-38) is approximately 7/16 in (1.1 cm) from the edge of the threads on drive shaft (2).

CAUTION
Make sure the gear teeth of both lateral tilt blocks are evenly engaged or the lateral tilt drive mechanism will not operate properly and will reduce the life expectancy of the components.

(25) While standing at the head end of the surgery table, install both lateral tilt blocks (3) on wheel housings (4) so the left side of both lateral tilt blocks tilt upward to the left as far as possible.

CAUTION
Watch the trip lever of the limit switch when performing the following step. Make sure the trip lever is not bent backward by the lateral tilt block. Guide the trip lever around the lateral tilt block if necessary. Failure to do so could result in damaged limit switch.

(26) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the LATERAL TILT LEFT button until the lateral tilt blocks (3) are approximately level.

(27) Install lateral tilt cover (2, Figure 4-37) on trendelenburg plate (3) and secure with two screws (1).

DANGER
The table top is very heavy. Use an assistant to help lift the table top into position on the surgery table. Use proper lifting techniques to prevent back strain.

CAUTION
Make sure the foot casting and the back casting remain in the folded up position when the table top is being removed. Failure to do so could result in damage to the foot or back transducers or their cable/turnbuckle assemblies.

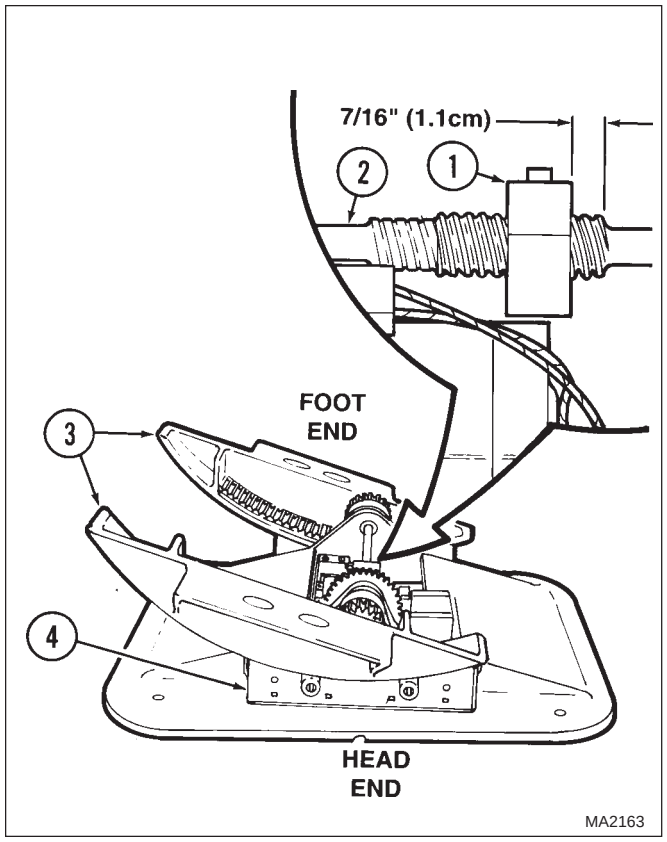

Figure 4-38. Lateral Tilt Block Installation

(28) With the help of an assistant, position the table top (2, Figure 4-39) on two lateral tilt blocks (3).

(29) While an assistant slightly raises the foot end of the table top (2), install two ground wires (5) on seat casting of table top and secure with screw (4).

(30) With the help of an assistant, insert four locator pins of seat casting in four locator holes of lateral tilt blocks (3).

(31) Secure seat casting of table top (2) to two lateral tilt blocks (3) with four screws (1).

(32) Tighten two setscrews (1, Figure 4-40) until they start to become harder to turn.

(33) Lift up on one end of table top (2). If the lateral tilt block (3) pulls away from the wheel housing (4), even slightly, some backlash between the gears still remain.

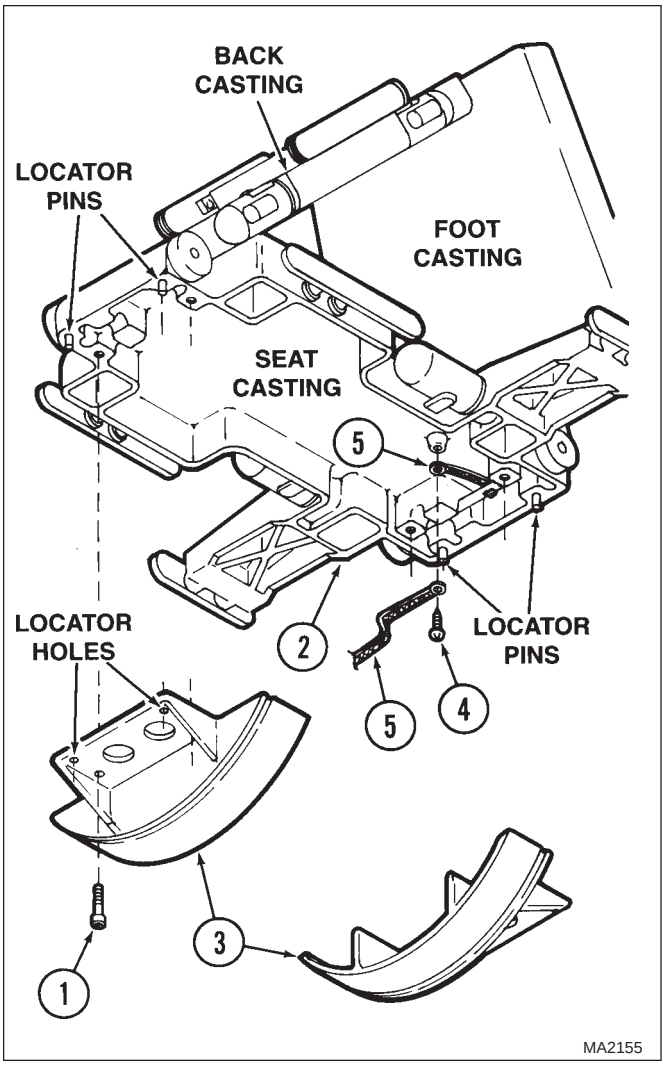

Figure 4-39. Table Top Installation

(34) If backlash remains, tighten the setscrew (1) on that end of the table top (2) one full turn. Repeat steps 33 and 34 until no backlash remains.

(35) Repeat steps 33 and 34 for the other end of the table top (2).

CAUTION

Run the lateral tilt function of the surgery table following the completion of the following step. If the motor sounds like it is laboring excessively, the setscrews have been overtightened. If so, repeat steps 33 thru 36 taking care not to overtighten setscrews.

(36) Tighten two screws (5) to secure each wheel housing (4) in position.

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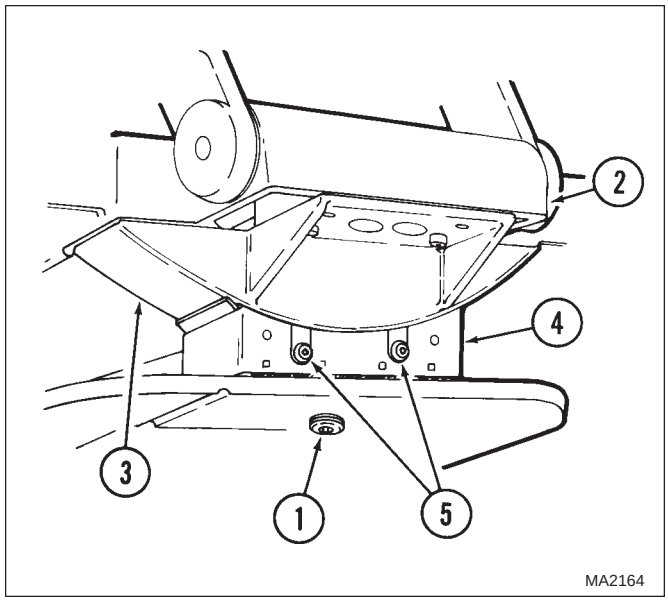

Figure 4-40. Backlash Adjustment

(37) Connect wire harness (5, Figure 4-41) to foot transducer (6).

(38) Connect wire harness (2) to back transducer (3).

(39) Secure wire harnesses (2 and 5) to foot transducer (6) with cable tie (4).

(40) Secure wire harness (2) to back transducer (3) with cable tie (1).

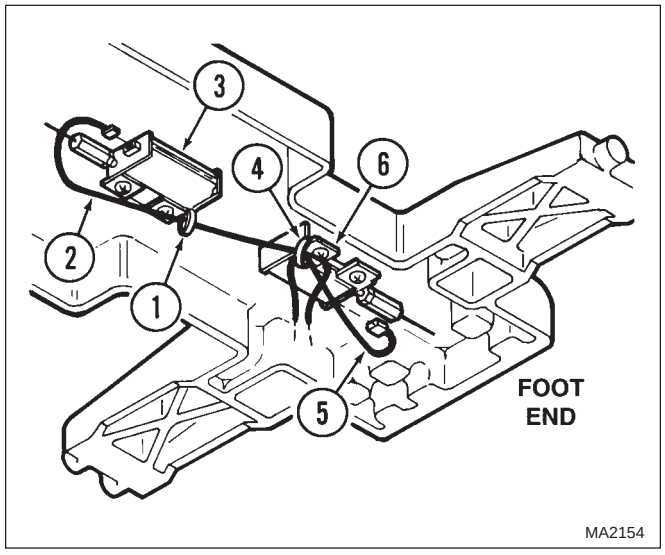

Figure 4-41. Connecting Wire Harnesses

NOTE
Access to the inside screw can be obtained thru the access hole. If the access hole is not lined up with inside screw (12), operate the lateral tilt function of the surgery table until it is. Remember, early units do not have an access hole.

(41) Install back clevis (9, Figure 4-42) on seat casting (13) and secure with two screws (12).

(42) Install hole plug (10) in access hole in trendelenburg plate (11).

(43) Install back actuator (4) on back clevis (9) and secure with two plastic spacers (8), clevis pin (7), and two E-rings (6).

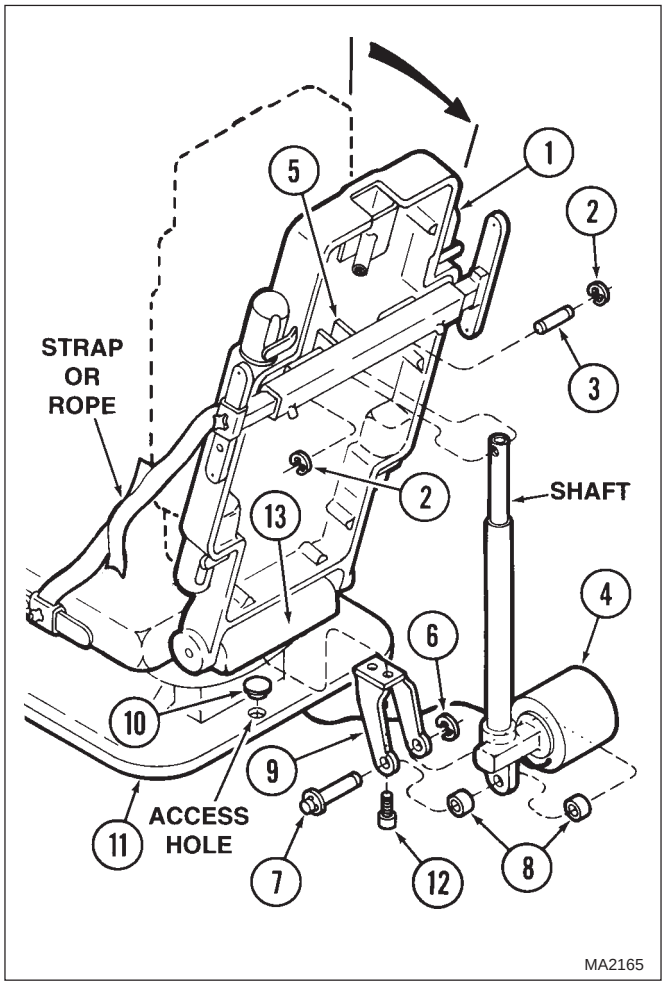

Figure 4-42. Back Actuator Connection

CAUTION
Do not lower the back casting past its horizontal plane or let the back casting fall downward. If the back casting goes down past the horizontal plane, damage to the back transducer and/or cable/turnbuckle assembly will result.

(44) Remove the straps or ropes and lower the back casting (1) until the shaft of back actuator (4) can be positioned on outer tube weldment (5).

(45) Secure the shaft of back actuator (4) to outer tube weldment (5) with clevis pin (3) and two E-rings (2).

(46) Install the back cover (Refer to para 4-2).

(47) Install foot clevis (10, Figure 4-43) on seat casting (12) and secure with two screws (11).

CAUTION
Do not lower the foot casting or allow the foot casting to fall downward. If the foot casting goes down past -85° from the horizontal plane, damage to the foot transducer and/or cable/turnbuckle assembly will result.

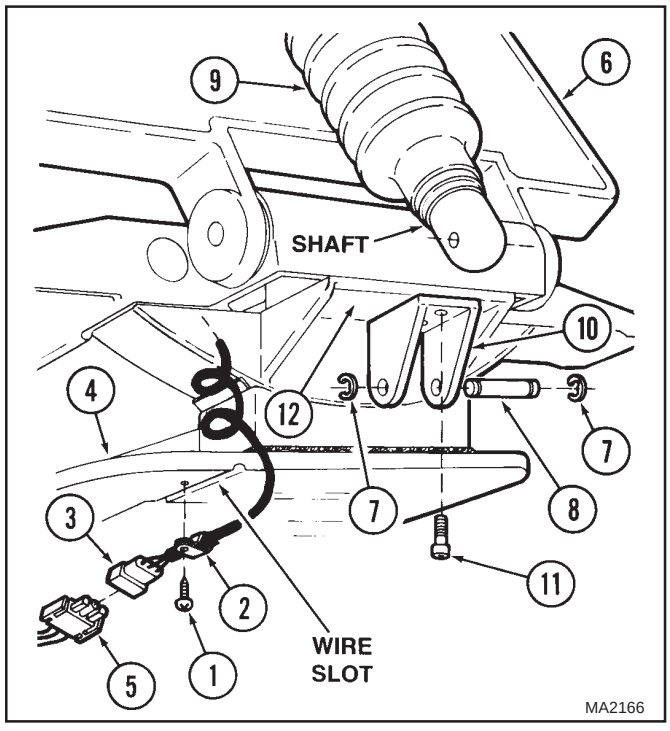

Figure 4-43. Foot Actuator Connection

(48) Remove ropes or straps and lower foot casting (6) until the shaft of foot actuator (9) can be positioned on foot clevis (10).

(49) Secure the shaft of foot actuator (9) on foot clevis (10) with clevis pin (8) and two E-rings (7).

(50) Connect coil cord wire harness (3) to table wire harness (5).

(51) Position coil cord wire harness (3) in wire slot of trendelenburg plate (4) and secure in place with wire clip (2) and screw (1).

(52) Raise the bellows assembly (Refer to para 4-3).

NOTE
Even if the back and foot transducers need adjusted, do not perform a calibration of the surgery table at this time.

(53) Check the adjustments of the back and foot transducers (Refer to paras 4-7 and 4-17).

CAUTION
Observe the transducer rod of the lateral tilt transducer when moving the lateral tilt function during the following step. If the transducer was not set up perfectly during installation, the transducer rod is likely to run out of travel when the lateral tilt function is moved to the end of its travel. This could damage the lateral tilt transducer. To correct this problem, loosen two screws and allow lateral tilt transducer to slide in the direction which will alleviate the over-extension condition of the transducer rod. Tighten the two screws and continue with the adjustment procedure. If this does not work, the cable/turnbuckle assembly can be unscrewed a couple of turns. If there is still an over-extension problem, remove two screws securing nut guide to lead nut, unscrew guide nut one turn, and reattach lead nut to nut guide.

(54) Adjust the lateral tilt transducer (Refer to para 4-21).

(55) Perform a PC control board calibration (Refer to para 4-33).

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4-19. Lateral Tilt Left or Right Limit Switch Removal / Installation

A. Removal

NOTE
The following procedure describes removal of the right limit switch. The left limit switch is removed in the same way.

(1) Remove two screws (1, Figure 4-44) and push lateral tilt cover (2) up out of the way.

NOTE
If the lateral tilt function will not move because of a malfunctioning limit switch, consult the wiring diagram, and use a jumper wire in the lateral tilt wire harness plug to jumper past the malfunctioning limit switch. For the right limit switch, a jumper wire would be needed between the two white/brown wires of the limit switch. For the left limit switch, a jumper wire would be needed between the two white/red wires of the limit switch. CAUTION - If a jumper wire is added, the lateral tilt function will have nothing to stop it. Be careful not to run the lateral tilt function past its normal stopping point. Remove the jumper wire at the completion of the procedure!

(2) If possible, operate the lateral tilt function in the direction which will provide the most working room.

(3) Disconnect all electrical power from the surgery table.

(4) Disconnect wire harness (3) from right limit switch (4).

(5) Loosen, but do not remove screws (6).

NOTE
Pushing the limit switch straight backward allows the front screw to clear the square locking notch in the bull gear bracket while pushing the limit switch to the right/left (depending if it is the right or left limit switch), allows the rear screw to clear the round locking notch. The limit switch is then free to be removed.

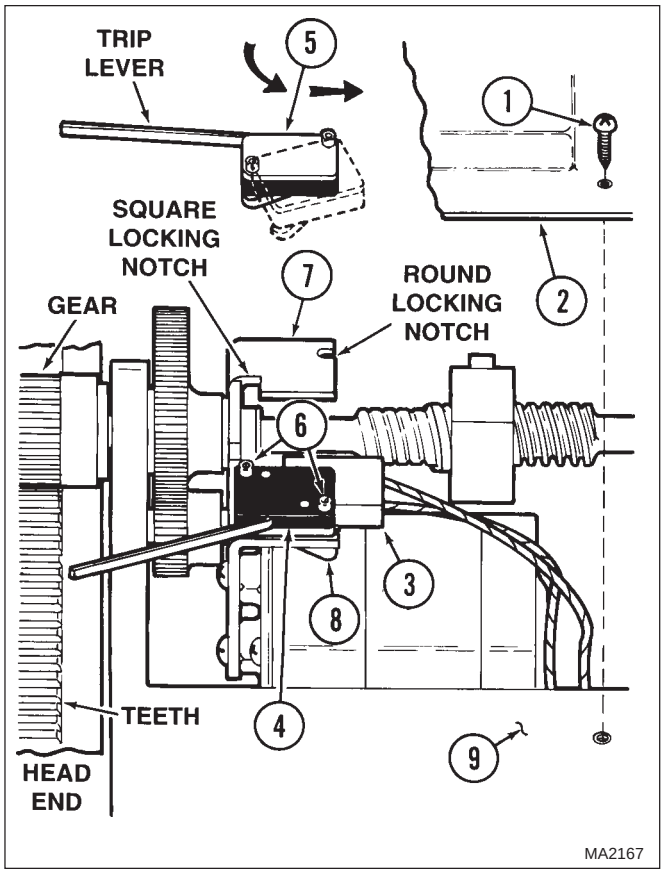

Figure 4-44. Limit Switch Removal / Installation

(6) If removing the right limit switch (4), remove limit switch from bull gear bracket (7) by pushing the limit switch straight backward and then toward the right. If removing the left limit switch (5), remove limit switch from bull gear bracket (7) by pushing the limit switch straight backward and then toward the left.

(7) Remove two screws (6) and clamp plate (8) from limit switch (4).

B. Installation

NOTE
The right limit switch has the black part of its housing pointing upward. The left limit switch has the white part of its housing pointing upward.

(1) Install clamp plate (8) on limit switch (4) and secure with two screws (6). Tighten two screws (6) only a couple of threads.

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(2) Slide the limit switch (4) onto bull gear bracket (7), making sure the rear screw is inserted in the round locking notch and the front screw is inserted in the square locking notch. Secure limit switch in position by tightening two screws (6).

(3) Connect wire harness (3) to limit switch (4).

(4) Connect electrical power to the surgery table.

(5) Operate the lateral tilt function of the surgery table to trip the newly installed limit switch. If the limit switch does not trip before the gear runs out of teeth, bend the trip lever of the limit switch slightly. Repeat step until limit switch trips just before gear runs out of teeth.

(6) Position lateral tilt cover (2) on trendelenburg plate (9) and secure with two screws (1).

(7) Adjust the lateral tilt transducer (Refer to para 4-21).

CAUTION
Step 8 needs to be performed even if the lateral tilt transducer did not need to be adjusted.

(8) Perform a PC control board calibration (Refer to para 4-33).

4-20. Lateral Tilt Transducer Removal / Installation

A. Removal

(1) Remove two screws (1, Figure 4-45) and push the lateral tilt cover (2) up out of the way.

(2) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, operate the lateral tilt function to the position which provides the best access.

(3) Cut cable tie (3) which secures wire harness (4) to lateral tilt transducer (5).

(4) Disconnect wire harness (4) from lateral tilt transducer (5).

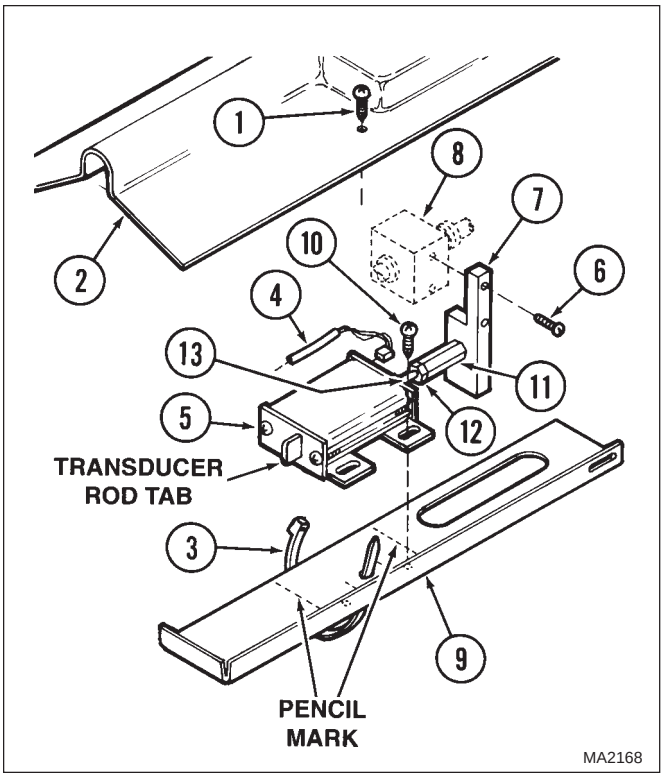

Figure 4-45. Lateral Tilt Transducer Removal / Installation

(5) While pressing transducer rod tab to relieve tension, remove two screws (6) which secures nut guide (7) to lead nut (8). Release transducer rod tab.

(6) Using a pencil or sharp object, mark the present position of the lateral tilt transducer (5) on the transducer plate (9) by tracing the outline of the lateral tilt transducer mounting brackets.

(7) Remove two screws (10) and lateral tilt transducer (5) from transducer plate (9).

(8) While holding turnbuckle (11), loosen nut (12).

(9) Unscrew turnbuckle (11) from transducer rod (13).

(10) Remove nut (12) from transducer rod (13).

B. Installation

(1) Screw nut (12) onto transducer rod (13) fully until the threads run out.

(2) Screw turnbuckle (11) onto transducer rod (13) until half of the transducer rod's threads are covered.

(3) Connect wire harness (4) to lateral tilt transducer (5).

(4) Position lateral tilt transducer (5) on transducer plate (9) and align the lateral tilt transducer with the pencil marks made during removal. Secure the lateral tilt transducer (5) in position with two screws (10).

(5) Press on transducer rod tab until the nut guide (7) is aligned with lead nut (8) and then secure nut guide to lead nut with two screws (6).

(6) Secure wire harness (4) to lateral tilt transducer (5) with cable tie (3).

(7) Adjust the lateral tilt transducer (Refer to para 4-21).

4-21. Lateral Tilt Transducer Adjustment

A. Adjustment

(1) Remove electrical cover (Refer to para 4-4).

(2) Plug the positive probe of the multimeter into Test Point 4 and the negative probe of the multimeter into Test Point 6 on PC control board. See Figure 4-46.

NOTE
If the lateral tilt adjustment procedure is being performed as a result of installing a new lateral tilt transducer, steps 3 and 5 will already be completed and will not need to be performed.

(3) Remove two screws (1, Figure 4-46) and push lateral tilt cover (2) up out of the way.

NOTE
The lateral tilt function has reached the end of its travel when the limit switch is tripped.

(4) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the LATERAL TILT RIGHT button until the function reaches the end of its travel.

(5) While holding turnbuckle (3), loosen nut (4).

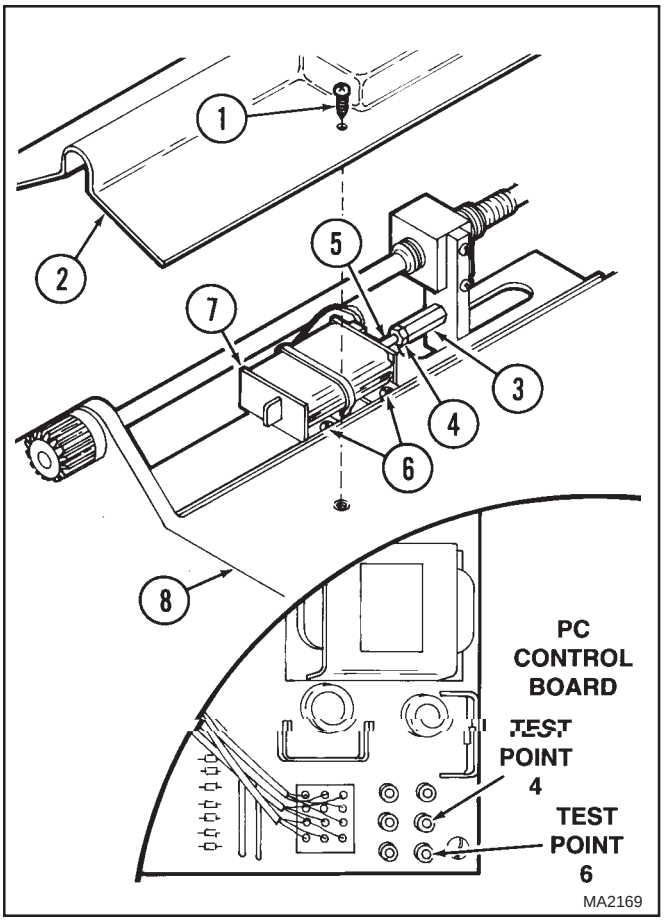

Figure 4-46. Lateral Tilt Transducer Adjustment

NOTE
The desired setting for the lateral tilt transducer is 4.0 VDC. The setting cannot be lower than 3.5 VDC or higher than 4.5 VDC.

(6) Screw in or unscrew the turnbuckle (3) until the multimeter reads 4.0 VDC + 0.5 VDC/ -0.5 VDC. If the proper voltage setting is obtained, proceed to step 10. If the turnbuckle (3) runs out of adjustment before the proper voltage setting is obtained, perform steps 7 thru 9.

(7) Screw in or unscrew turnbuckle (3) until it is centered on the threads of transducer rod (5).

NOTE
Slide lateral tilt transducer to the left if voltage setting cannot be adjusted high enough. Slide lateral tilt transducer to the right if voltage setting cannot be adjusted low enough.

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(8) Loosen two screws (6) and slide the lateral tilt transducer (7) to the left or right as necessary.

(9) Tighten two screws (6). Repeat step 6.

(10) While holding turnbuckle (3), tighten nut (4), making sure the voltage setting does not change.

NOTE
The lateral tilt function has reached the end of its travel when the limit switch is tripped.

(11) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the LATERAL TILT LEFT button until the function reaches the end of its travel.

(12) Check the voltage reading of the multimeter. The voltage reading must be between 0.5 to 1.5 VDC. The difference between the voltage measured in step 6 and the voltage measured in this step must be at least 2.5 VDC. If not, repeat steps 4 thru 12. If problem persists, lateral tilt transducer may be malfunctioning.

(13) Remove positive and negative probes of multimeter from Test Points 4 and 6.

(14) Position lateral tilt cover (2) on trendelenburg plate (8) and secure with two screws (1).

(15) Perform a PC control board calibration (Refer to para 4-33).

(16) Install electrical cover (Refer to para 4-4).

4-22. Ratchet Knob Removal / Installation

A. Removal

(1) If removing one of the four ratchet knobs mounted on the back casting, remove the back cover (Refer to para 4-2). If removing one of the two ratchet knobs mounted on the seat casting, remove the table top (Refer to para 4-18).

(2) Rotate ratchet knob (1, Figure 4-47) until setscrew (2) can be reached and then loosen setscrew.

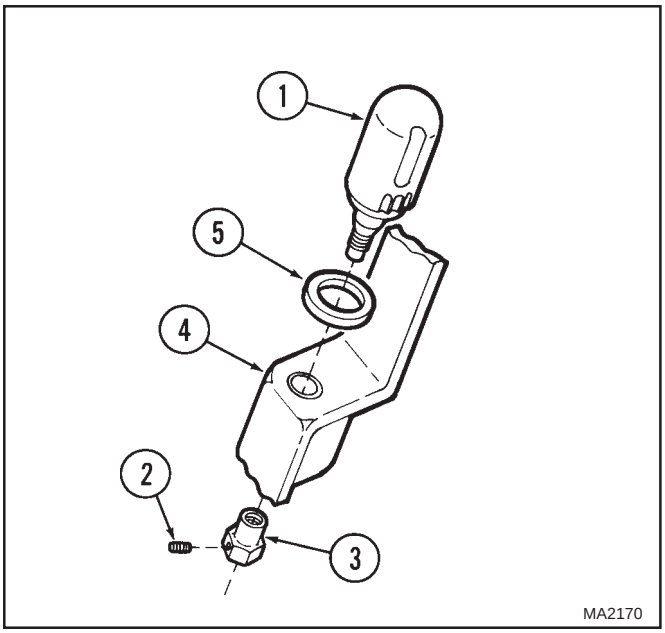

Figure 4-47. Ratchet Knob Removal / Installation

(3) While jamming nut (3) with a screwdriver, rotate ratchet knob (1) until nut is removed.

(4) Remove ratchet knob (1) from casting (4).

(5) Remove ratchet seal (5) from ratchet knob (1).

B. Installation

(1) Install ratchet seal (5) on ratchet knob (1).

(2) Install ratchet knob (1) in casting (4) and screw nut (3) onto ratchet knob as far as possible.

(3) While jamming nut (3) with a screwdriver, rotate ratchet knob (1) until nut is approximately "handtight".

(4) Tighten setscrew (2).

(5) Install back cover (Refer to para 4-2) or table top (Refer to para 4-18).

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4-23. Leaf Chain Tension Adjustment

A. Adjustment

NOTE
Allow the bearing in the base actuator to spin for a few seconds after the base function has reached the end of its travel, to ensure that the end of travel has been reached.

(1) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TABLE DOWN button until the base function reaches the end of its travel.

(2) Lower bellows assembly (Refer to para 4-3).

(3) Loosen screw (1, Figure 4-48).

(4) Place a 100 - 200 lb (45 - 91 kg) weight on the table top or get an assistant weighing this amount to sit on the table top.

(5) Loosen screw (2) and then coat threads of screw with removeable threadlocking adhesive (Loctite 242).

(6) Tighten screw (2) until screw becomes hard to turn. Do not overtighten.

(7) Tighten screw (1).

NOTE
Watch for jerking during the following step. If the tension is not adjusted properly, the column will jerk when being lowered or raised.

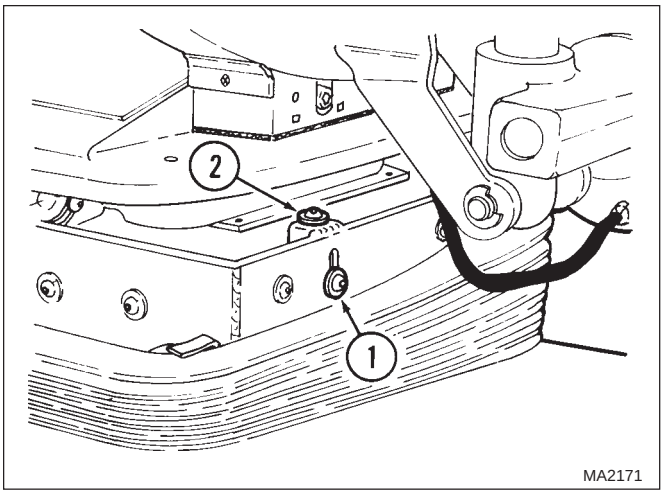

Figure 4-48. Leaf Chain Tension Adjustment

(8) Operate the surgery table and run the base function up and down several times. Repeat steps 1 thru 8 if necessary.

(9) Raise the bellows assembly (Refer to para 4-3).

4-24. Gas Spring Removal / Installation

A Removal

NOTE
Allow the bearing in the base actuator to spin for a few seconds after the base function has reached the end of its travel, to ensure that the end of travel has been reached.

(1) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TABLE UP button until the base function reaches the end of its travel.

(2) Lower the bellows assembly (Refer to para 4-3).

NOTE
If the gas spring is still putting pressure on shoulder screw, pry top of gas spring downward with a screwdriver to alleviate the pressure while removing shoulder screw.

(3) Remove shoulder screw (1, Figure 4-49) which secures gas spring (2) to inner slide (3).

(4) Depress brake pedal to lock the brakes.

DANGER
The surgery table is very heavy. Use proper lifting techniques to prevent back strain. Also, keep hands and feet out of pinch points.

CAUTION
Lower surgery table slowly to prevent any damage.

(5) With the help of an assistant, lay the surgery table onto its side.

(6) Remove shoulder screw (4) and rod end of gas spring (2) from middle slide (5).

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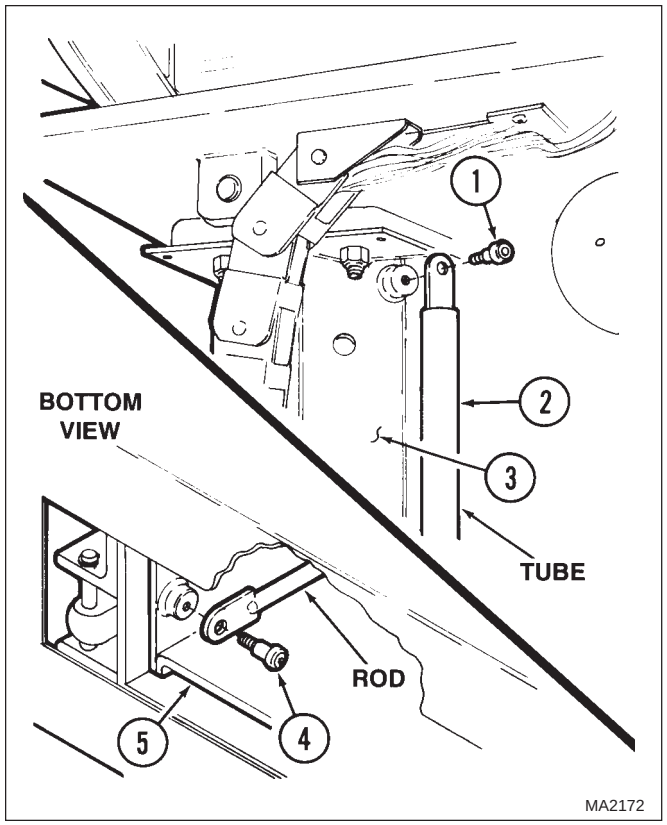

Figure 4-49. Gas Spring Removal / Installation

B. Installation

(1) Install rod end of gas spring (2) on middle slide (5) and secure with shoulder screw (4).

DANGER
The surgery table is very heavy. Use proper lifting techniques to prevent back strain. Also, keep hands and feet out of pinch points.

(2) With the help of an assistant, raise the surgery table to an upright position.

DANGER
Do not let fingers get between gas spring and inner slide. When the gas spring is pried downward, a large tension is produced. Failure to keep fingers clear could result in severely cut or pinched fingers.

(3) Using a screwdriver pry downward on gas spring (2) until shoulder screw (1) can be installed. Install shoulder screw.

(4) Raise the bellows assembly (Refer to para 4-3).

4-25. ENABLE Lamp Removal / Installation

A. Removal

(1) Disconnect all electrical power from surgery table.

(2) Remove two bolts (1, Figure 4-50), name plate (2), and light gasket (3) from base casting (4).

(3) Partially separate light bracket (5) from base casting (4).

(4) Disconnect two wires (6) from terminals of ENABLE lamp (7).

(5) Press on two tabs of ENABLE lamp (7), while simultaneously pulling the ENABLE lamp out of light bracket (5).

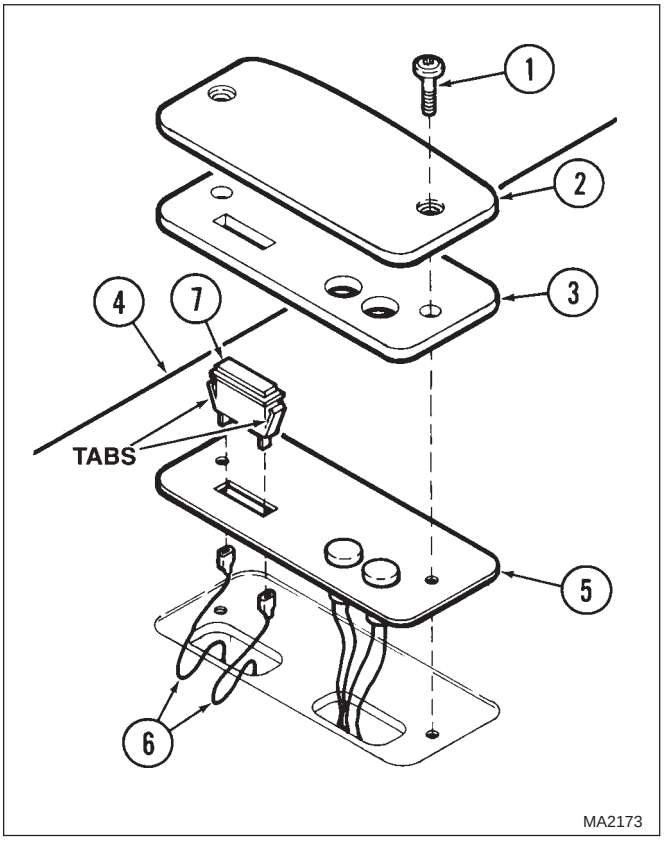

Figure 4-50. ENABLE Lamp Removal / Installation

B. Installation

(1) Push ENABLE lamp (7) into light bracket (5) until it "pops" into place.

(2) Connect two wires (6) to ENABLE lamp (7).

(3) Position light bracket (5) on base casting (4) and secure in position with light gasket (3), name plate (2), and two bolts (1).

4-26. POWER ON Lamp Removal / Installation

A. Removal

(1) Disconnect electrical power from surgery table.

(2) Remove two bolts (1, Figure 4-51), name plate (2), and light gasket (3) from base casting (4).

(3) Partially separate light bracket (5) from base casting (4).

(4) Disconnect two wires (6) from green POWER ON lamp (7).

(5) Press on two tabs of POWER ON lamp (7), while simultaneously pulling the POWER ON lamp out of light bracket (5).

B. Installation

(1) Push POWER ON lamp (7) into light bracket (5) until it "pops" into place.

(2) Connect two wires (6) to terminals of POWER ON lamp (7).

(3) Position light bracket (5) on base casting (4) and secure in position with light gasket (3), name plate (2), and two bolts (1).

4-27. POWER STANDBY Lamp Removal / Installation

A. Removal

(1) Disconnect all electrical power from surgery table.

(2) Remove two bolts (1, Figure 4-52), name plate (2), and light gasket (3) from base casting (4).

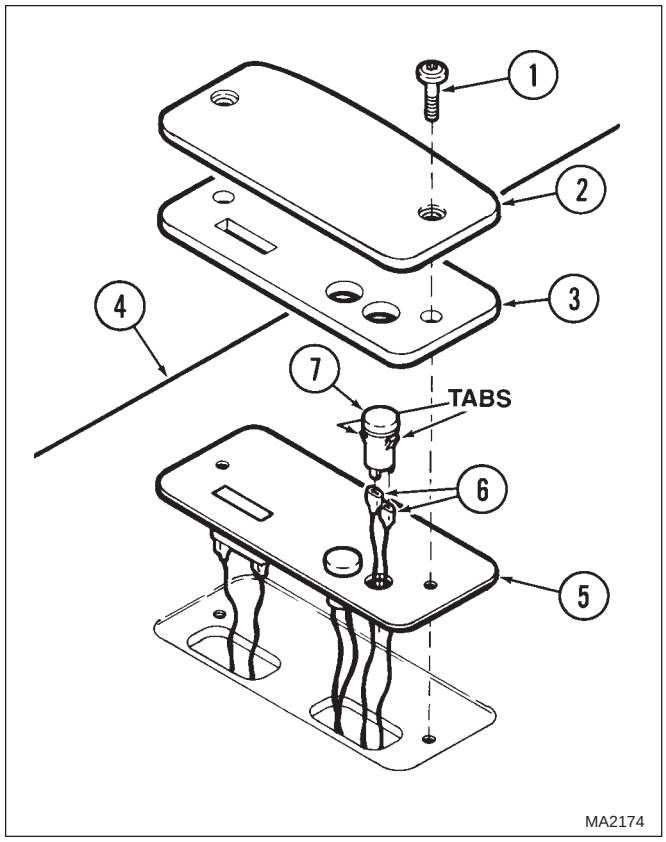

Figure 4-51. POWER ON Lamp Removal / Installation

(3) Partially separate light bracket (5) from base casting (4).

(4) Disconnect two wires (6) from terminals of red POWER STANDBY lamp (7).

(5) Press on two tabs of POWER STANDBY lamp (7), while simultaneously pulling the POWER STANDBY lamp out of light bracket (5).

B. Installation

(1) Push POWER STANDBY lamp (7) into light bracket (5) until it "pops" into place.

(2) Connect two wires (6) to terminals of POWER STANDBY lamp (7).

(3) Position light bracket (5) on base casting (4) and secure in position with light gasket (3), name plate (2), and two bolts (1).

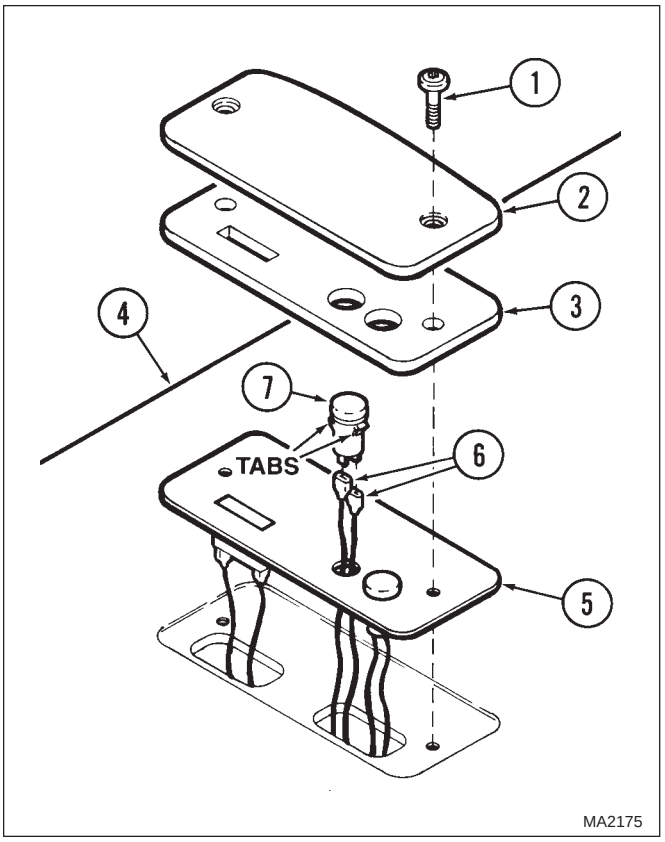

Figure 4-52. POWER STANDBY Lamp Removal / Installation

4-28. Emergency COMPUTER CONTROL OVERRIDE SWITCH Removal / Installation

A. Removal

(1) If possible, operate the surgery table to raise the table top as high as it will go.

(2) Lower the bellows assembly (Refer to para 4-3).

(3) Disconnect all electrical power from the surgery table.

(4) Remove two screws (1, Figure 4-53) and partially separate Emergency COMPUTER CONTROL OVERRIDE SWITCH (2) from electrical panel (3).

(5) Tag and disconnect two wires (4) from terminals of Emergency COMPUTER CONTROL OVERRIDE SWITCH (2) and remove switch.

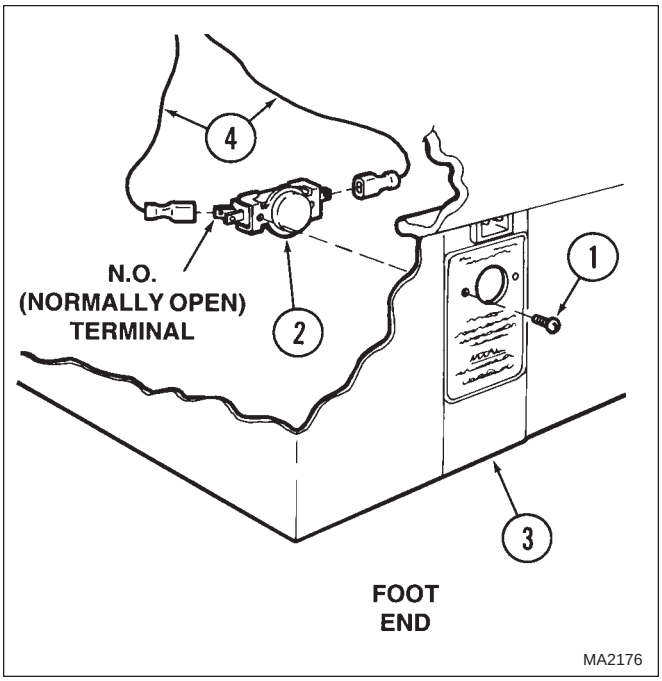

Figure 4-53. Emergency COMPUTER CONTROL OVERRIDE SWITCH Removal / Installation

B. Installation

NOTE
One end of the switch contains two terminals. The wire which is connected to this side of the switch must be connected to the N.O. (Normally Open) terminal of the switch.

(1) Connect two wires (4) to terminals of Emergency COMPUTER CONTROL OVERRIDE SWITCH (2).

(2) Position the Emergency COMPUTER CONTROL OVERRIDE SWITCH (2) on electrical panel (3) and secure with two screws (1).

(3) Raise the bellows assembly (Refer to para 4-3).

4-29. POWER ON / STANDBY Switch Removal / Installation

A. Removal

(1) Disconnect all electrical power from the surgery table.

(2) Remove two screws (1, Figure 4-54) and switch cover (2) from switch bracket (3).

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(3) Remove nut (4) and partially separate POWER ON / STANDBY switch (5) from switch bracket (3).

(4) Remove two screws (6) and switch bracket (3) from base casting (7).

(5) Pull POWER ON / STANDBY switch (5) out of switch hole as far as possible and then tag and disconnect six wires/wire harnesses (8) from terminals of POWER ON / STANDBY switch (5) and remove switch.

B. Installation

NOTE
The POWER ON / STANDBY switch can be installed with either side up; the position of the switch is not important, but the position of the wires on switch is.

(1) Connect six wires/wire harnesses (8) to terminals of POWER ON / STANDBY switch (5).

(2) Push the POWER ON / STANDBY switch (5) partially into the switch hole to allow the switch bracket (3) to be installed.

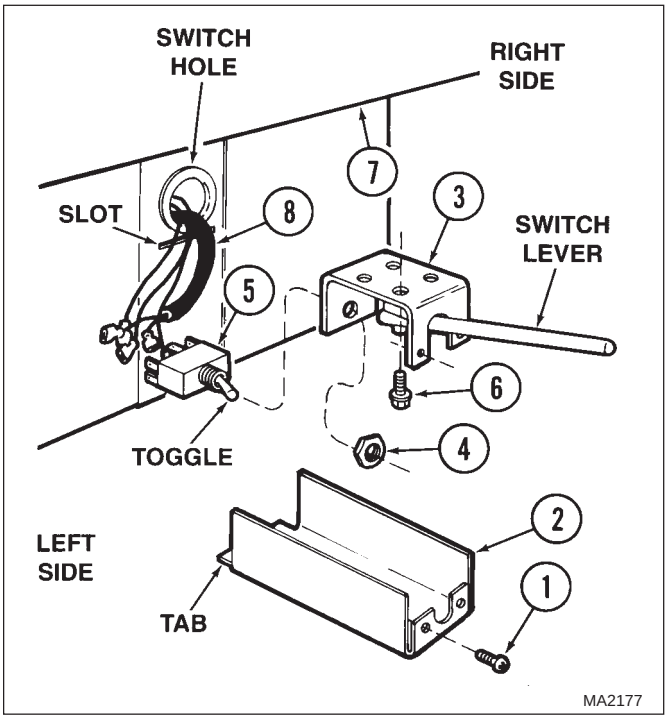

Figure 4-54. POWER ON / STANDBY Switch Removal / Installation

(3) Install switch bracket (3) on base casting (7) and secure with two screws (6).

NOTE
Rotate the POWER ON / STANDBY switch (5) so the side of the switch which contains two wires at one terminal is facing the ON side of the POWER ON / STANDBY decal. The switch must be installed on its side, so the toggle of the switch is activated in a left to right action; not an up and down action.

(4) Position the POWER ON / STANDBY switch (5) in switch bracket (3), making sure to insert toggle of switch in open end of switch lever and secure POWER ON / STANDBY switch in position with nut (4).

(5) Insert tab of switch cover (2) in slot and then secure other end of switch cover on switch bracket (3) with two screws (1).

4-30. Base, Trendelenburg, Foot, or Back Capacitor Removal / Installation

A. Removal

(1) Disconnect electrical power from surgery table.

(2) Remove electrical cover (Refer to para 4-4).

(3) Refer to Figure 4-55 to determine the location of the malfunctioning capacitor.

(4) Using a screwdriver, pry tab of capacitor mounting bracket (1, Figure 4-55) upward and remove capacitor (2) from capacitor mounting bracket.

(5) Remove capacitor cap (3) from capacitor (2).

DANGER
A capacitor contains stored electricity. Never touch terminals of a capacitor, even if power has been shut off. Always discharge capacitor before touching capacitor terminals or wires. Failure to comply with these instructions could result in serious personal injury or death.

(6) Discharge capacitor (2).

(7) Disconnect two wires (4) from terminals of capacitor (2).

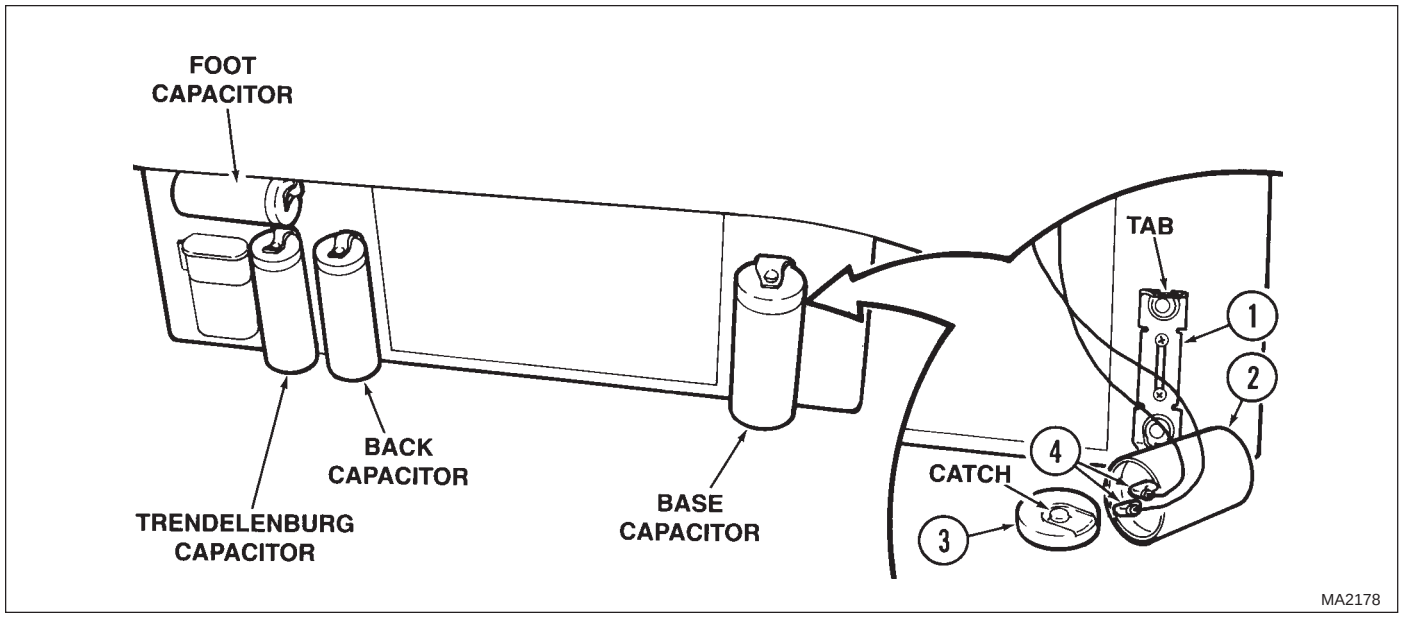

Figure 4-55. Base, Trendelenburg, Foot, or Back Capacitor Removal / Installation

B. Installation

NOTE
The wires can be connected to either terminal; there is no positive or negative terminal on the capacitor.

(1) Connect two wires (4) to terminals of capacitor (2).

(2) Install capacitor cap (3) on capacitor (2).

(3) Position the bottom of the capacitor (2) on capacitor mounting bracket (1) and then push the top of the capacitor inward. Using a screwdriver, force the tab of the capacitor mounting bracket (1) down over the catch of the capacitor cap (3).

(4) Install electrical cover (Refer to para 4-4).

(5) Connect electrical power to the surgery table.

4-31. Lateral Tilt Capacitor Removal / Installation

A. Removal

(1) Disconnect all electrical power from the surgery table.

(2) Remove electrical cover (Refer to para 4-4).

(3) Remove two screws (1, Figure 4-56), capacitor bracket (2), and partially separate lateral tilt capacitor (3) from electrical panel (4).

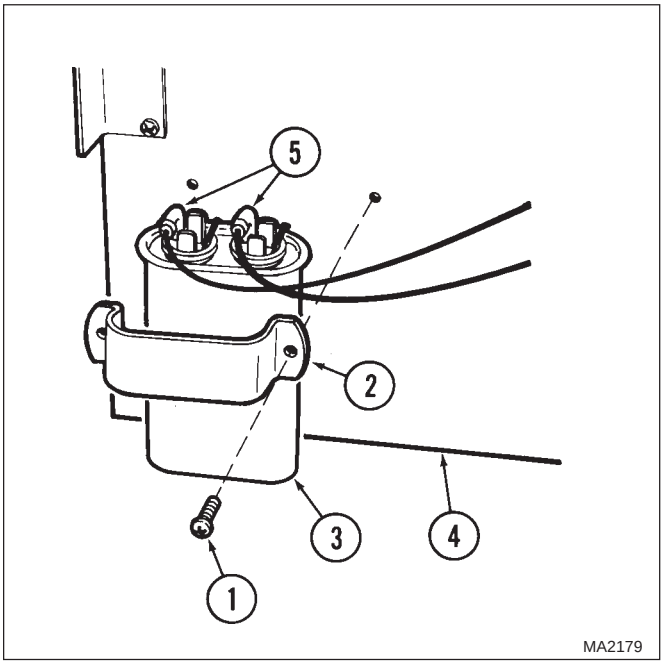

Figure 4-56. Lateral Tilt Capacitor Removal / Installation

DANGER
A capacitor contains stored electricity. Never touch terminals of a capacitor, even if power has been shut off. Always discharge capacitor before touching capacitor terminals or wires. Failure to comply with these instructions could result in serious personal injury or death.

(4) Discharge lateral tilt capacitor (3).

(5) Disconnect two wires (5) from terminals of lateral tilt capacitor (3) and remove lateral tilt capacitor.

B. Installation

NOTE
The wires can be connected to either terminal; there is no positive or negative terminal on the capacitor.

(1) Connect two wires (5) to terminals of lateral tilt capacitor (3).

(2) Position lateral tilt capacitor (3) on electrical panel (4) and secure with capacitor bracket (2) and two screws (1).

(3) Install electrical cover (Refer to para 4-4).

(4) Connect electrical power to the surgery table.

4-32. PC Control Board Removal / Installation

A. Removal

(1) Disconnect all electrical power from the surgery table.

(2) Remove the electrical cover (Refer to para 4-4).

(3) Tag and disconnect ten wire harnesses (1, Figure 4-57) from connectors of PC control board (2).

CAUTION
The PC control board is an Electrostatic Sensitive Device (ESD). Static discharge can damage the sensitive logic devices on the PC control board. Use proper precautionary procedures and grounding straps when touching the PC control board.

(4) Remove six screws (3) and PC control board (2) from electrical panel (4).

B. Installation

CAUTION
The PC control board is an Electrostatic Sensitive Device (ESD). Static discharge can damage the sensitive logic devices on the PC control board. Use proper precautionary procedures and grounding straps when touching the PC control board.

(1) Install PC control board (2) on electrical panel (4) and secure with six screws (3).

(2) Connect ten wire harnesses (1) to connectors of PC control board (2).

(3) Connect electrical power to the surgery table.

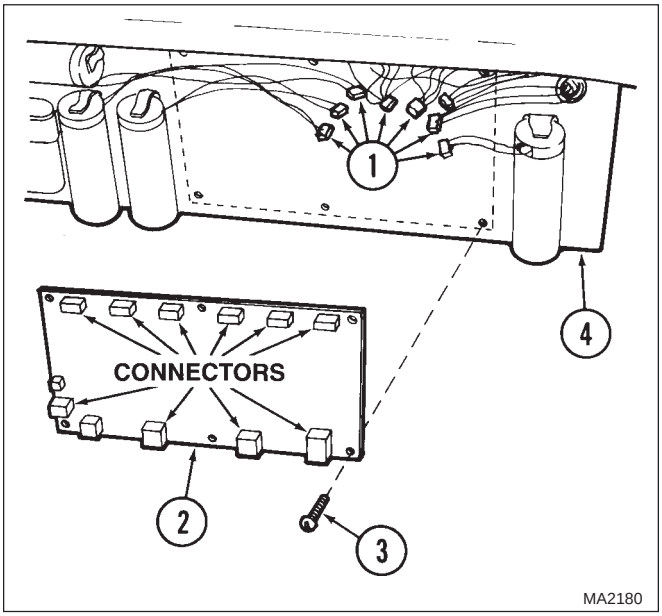

Figure 4-57. PC Control Board Removal / Installation

(4) Perform a PC control board calibration (Refer to para 4-33).

(5) Install electrical cover (Refer to para 4-4).

4-33. PC Control Board Calibration

A. Calibration

(1) Remove electrical cover (Refer to para 4-4).

(2) Press and hold the CALIBRATION button until a continuous fast beep sounds; then release the CALIBRATION button. See Figure 4-58.

DANGER

The surgery table will automatically move each of the five functions to their extreme limits of travel. Failure to keep clear of the pinch points of the surgery table during this routine could result in serious personal injury.

CAUTION

The calibration procedure will automatically move each of the five functions to their extreme limits of travel. Failure to keep all potential obstructions out of the path of the surgery table could result in damage to the surgery table and/or an unsuccessful calibration procedure.

(3) Press and release the CALIBRATION button.

(4) Observe. The continuous fast beeping sound should be replaced by a two second interval beeping sound and the surgery table should begin its calibration routine. The two second interval beeping will continue to sound during the calibration routine. When the calibration routine is complete, the two second interval beeping sound will be replaced by a continuous fast beep sound.

(5) Check the five transducer fail LED's. If no LED's are illuminated, proceed to step 6. If any LED's are flashing or illuminated at this time, it indicates that the transducer for that function has failed and the calibration procedure was not successful. In this case, remove power from the surgery table for 20 seconds, adjust or replace the failed transducer and repeat the calibration procedure.

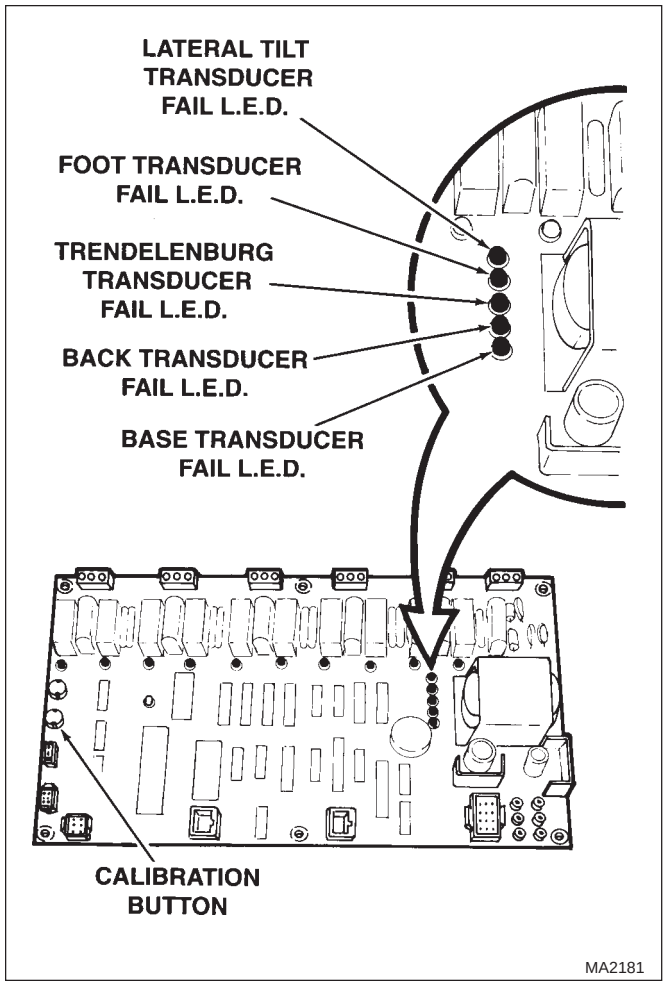

Figure 4-58. PC Control Board Calibration

(6) Press and release the CALIBRATION button.

(7) Observe. The continuous fast beeping sound should stop.

(8) Press the ENABLE button on the pendant hand control.

(9) Observe. If the PC control board sounds a single beep, the calibration procedure was successful. If the PC control board sounds a double beep, the calibration procedure was not successful.

(10) If the calibration procedure was successful, proceed to step 11. If the calibration procedure was not successful, repeat steps 2 thru 9. If the calibration procedure is still not successful, replace the PC control board.

(11) Install electrical cover (Refer to para 4-4).

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4-34. Caster Removal / Installation

A. Removal

(1) Depress the brake pedal to lock the brakes.

DANGER
The surgery table is very heavy. Have an assistant help lay the surgery table on its side. Stay out of the path of the surgery table in case it breaks free. Use proper lifting techniques to prevent back strain.

(2) With the help of an assistant, lay the surgery table onto its side so the caster being removed is up in the air.

NOTE
The illustration, Figure 4-59, shows the caster removal / installation for the head end *and* foot end of the table. If you are removing a caster from the head end of the surgery table, only remove components shown on the head end of the table and if you are removing a caster from the foot end of the surgery table, only remove components shown on the foot end of the table.

(3) Remove nut (1, Figure 4-59), two fiber washers (2), throw rod (3), and shoulder screw (4) from brake pedal *or* connecting lever (5).

(4) Remove two screws (6) from base casting (7) which secures caster (8) (Caster being removed.).

(5) Remove two setscrews (9) from brake pedal *or* connecting lever (5).

(6) Using a soft faced mallet, drive the brake pedal *or* connecting lever (5) away from caster (8) (Caster being removed), until the brake actuator bar (10) closest to the caster becomes free of the brake pedal *or* connecting lever.

(7) Slide the brake actuator bar (10) away from the caster (8) (Caster being removed), until the brake actuator bar becomes free and can be removed.

(8) Remove caster (8) from the base casting (7).

B. Installation

NOTE
Steps 1 and 2 are performed on the caster before it is installed. These steps are necessary to ensure that the caster installed with the proper orientation so the caster will operate correctly.

(1) Insert the brake actuator bar (10) into the actuator hole of caster (8).

CAUTION
Use care not to scar or damage the brake actuator bar in the following step or installation could be difficult.

Make sure the caster is fully set in the brake position during the following steps.

(2) Using a vise grips and a soft cloth, turn the brake actuator bar (10) until the caster (8) is locked in brake mode. (When the caster is in brake mode, the caster wheels will not rotate and the caster stem cannot be rotated either.) Remove the brake actuator bar (10) from caster (8).

(3) Coat the threads of two screws (6) with removeable threadlocking adhesive (Loctite 242).

NOTE
There is a slot on each side of the caster's stem 180° apart. When the caster is in the brake mode, the portion of the cam that can be seen in one slot is a perfect arc while the portion of the cam that can be seen in the other slot has a cutout in it. The slot which contains the cutout portion of the cam should always be pointed toward the head end of the surgery table when the caster is installed in the base casting. This is true for all four casters. If the caster is installed backward, the brakes will not work.

(4) Orient the caster (8) as described in the above note. Then, install caster (8) into base casting (7) and secure with two screws (6).

(5) Install the brake actuator bar (10) into actuator hole of caster (8). Push brake actuator bar (10) into caster until it is past the brake pedal *or* connecting lever (5).

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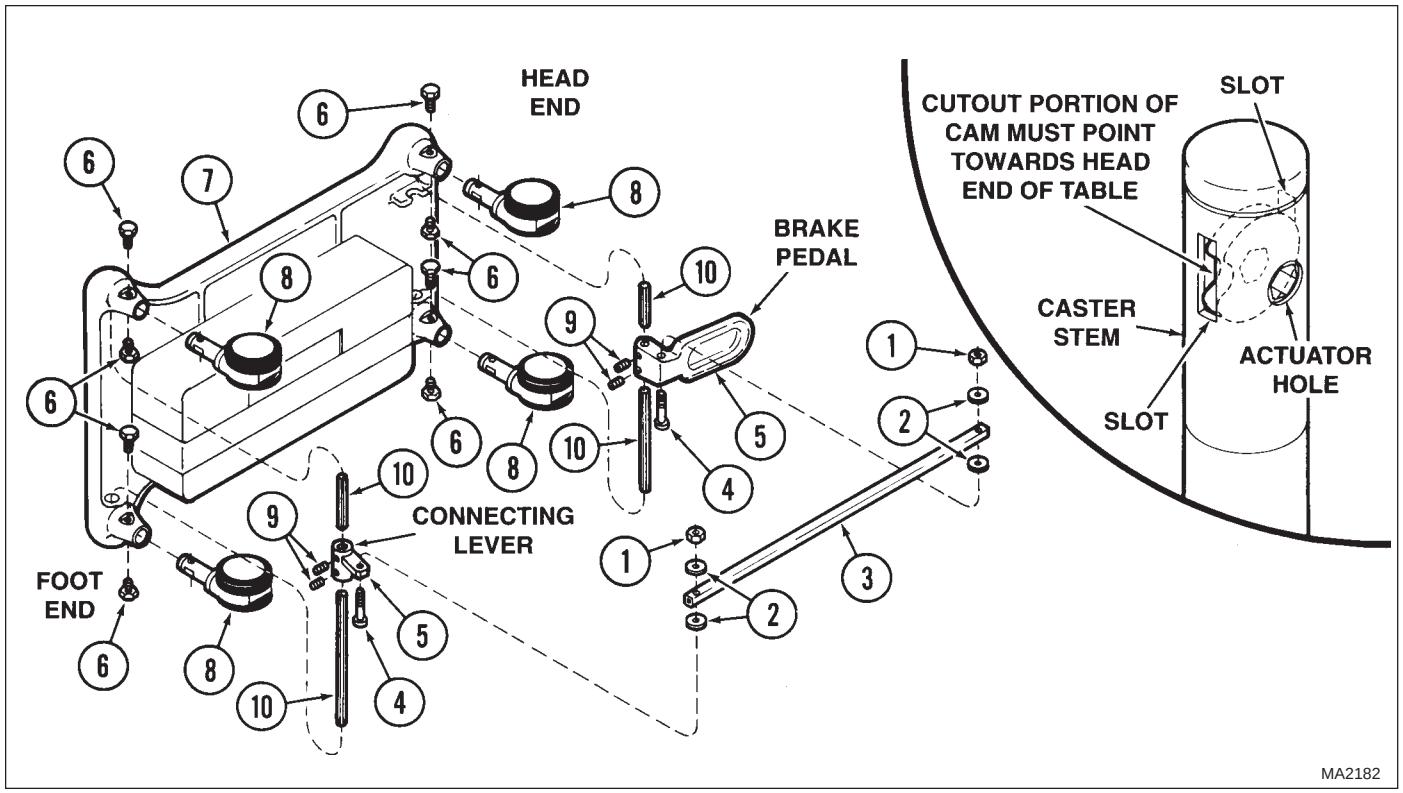

Figure 4-59. Caster Removal / Installation

CAUTION
Make sure the brake pedal *or* connecting lever is in the brake position before performing the following step or the brakes will not operate properly when the procedure is completed.

(6) Align the ends of both brake actuator bars (10) and then, using a soft faced mallet, drive the brake pedal *or* connecting lever (5) toward the newly installed caster until the brake pedal *or* connecting lever is centered over the ends of both brake actuator bars (10).

CAUTION
Make sure each setscrew is contacting a separate brake actuator bar. Failure for each brake actuator bar to be secured could result in brake failure.

(7) Install two setscrews (9) to secure brake pedal *or* connecting lever (5) in position on brake actuator bars (10).

(8) Install shoulder screw (4), fiber washer (2), throw rod (3), and fiber washer (2) on brake pedal *or* connecting lever (5) and secure with nut (1).

DANGER
The surgery table is very heavy. Have an assistant help raise the surgery table to its upright position. Stay out of the path of the surgery table in case it breaks free. Use proper lifting techniques to prevent back strain.

(9) With the help of an assistant, raise the surgery table to an upright position.

(10) Making sure the brake pedal is depressed, attempt to move the surgery table and observe the newly installed caster (8). The caster should not rotate. If the caster rotates, adjust the caster (Refer to para 4-35). If this does not correct the problem, the caster was probably installed backwards.

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4-35. Caster Brake Adjustment

A. Adjustment

(1) Depress brake pedal to the brake position.

NOTE
The surgery table does not need to be raised to adjust a caster. A standard Allen Wrench will allow the adjusting screw to be adjusted.

(2) If a caster is not braking properly, tighten adjusting screw (1, Figure 4-60) a couple of turns.

(3) Attempt to move the surgery table and observe the caster which was adjusted. If the caster makes a ratcheting noise and rotates, the caster was not adjusted tightly enough and step 2 should be repeated as necessary.

(4) Raise the brake pedal to the neutral position.

(5) Attempt to move the surgery table and observe the caster which was adjusted. If the caster makes a ratcheting noise *now*, the caster brake was adjusted too tightly. Adjusting screw (1) should be loosened slightly, until the ratcheting noise stops. Then repeat step 3 to recheck the brake adjustment. If the caster did not make a ratcheting noise, the adjustment procedure is complete.

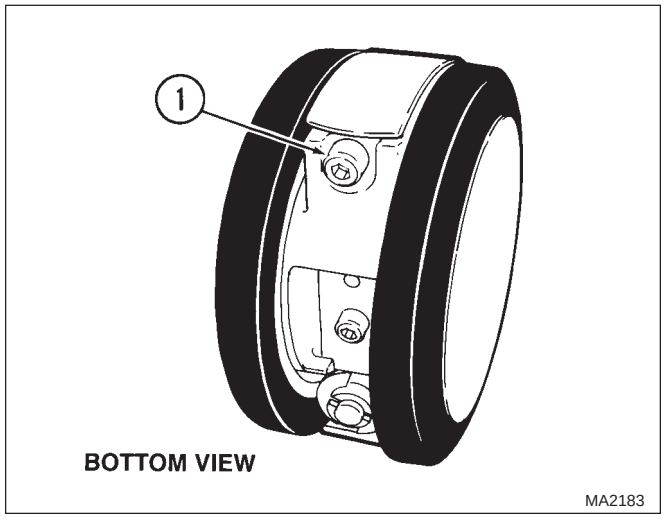

Figure 4-60. Caster Brake Adjustment

4-36. Hand Control Panel or Interface Board Removal / Installation

A. Removal

(1) Disconnect coil cord (1, Figure 4-61) from pendant hand control.

(2) Remove two screws (2) and top end cap (3) from hand control tube (4).

(3) Remove locating plate (5) from hand control tube (4).

CAUTION
Do not apply an excessive pulling force to the ribbon connector. Damage to the control interface board or hand control panel could result.

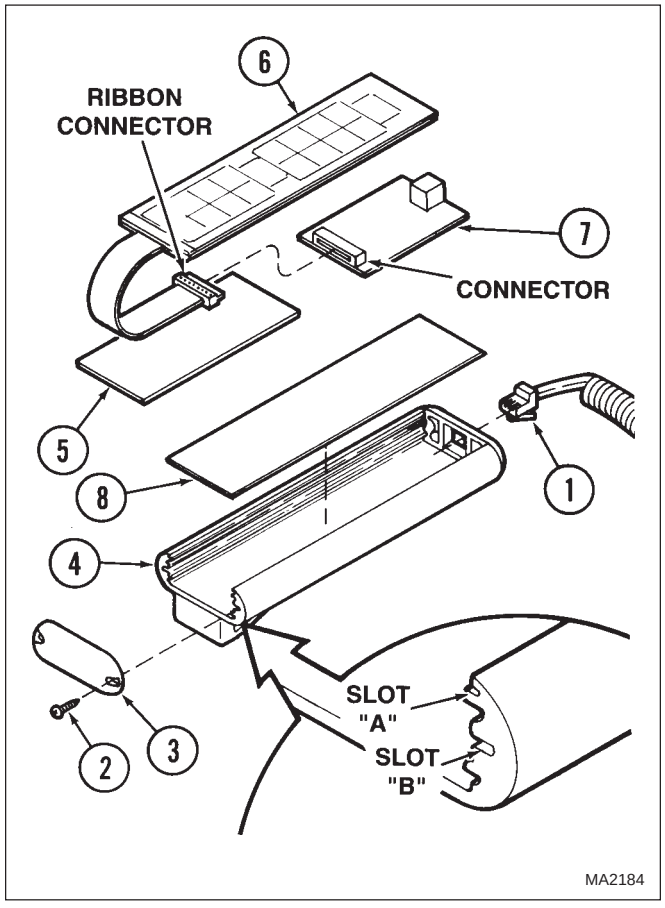

Figure 4-61. Hand Control Panel or Interface Board Removal / Installation

NOTE
The hand control panel is hard to slide, but the control interface board slides easily. If the hand control panel is pulled out first, the control interface board should follow.

(4) Remove hand control panel (6) and control interface board (7) as an assembly from hand control tube (4).

(5) Disconnect ribbon connector of hand control panel (6) from connector on control interface board (7).

B. Installation

(1) Connect ribbon connector of hand control panel (6) to connector of control interface board (7).

(2) Make sure fishpaper (8) is on the bottom of hand control tube (4).

CAUTION
Do not apply an excessive pulling force to the ribbon connector. Damage to the control interface board or hand control panel could result.

(3) Simultaneously, slide hand control panel (6) into Slot A and control interface board (7) into Slot B of hand control tube (4).

(4) Install locating plate (5) into Slot B of hand control tube (4).

(5) Install top end cap (3) on hand control tube (4) and secure with two screws (2).

(6) Connect coil cord (1) to pendant hand control.

4-37. Column Assembly Removal / Installation

A. Removal

(1) Remove the back cover (Refer to para 4-2).

(2) Lower the bellows assembly (Refer to para 4-3).

(3) Operate the surgery table to place the table top in a horizontal position. See Figure 4-62.

(4) Operate the surgery table to raise the table top as high as it will go.

(5) Depress the brake pedal to the brake position.

DANGER
The table top will be completely disconnected from the surgery table, except for the wire harnesses. The table top must be supported at two contact points on each end of the table top to prevent it from tipping over. At least two jacks or supports must be placed under each end of the table top to prevent the table top from tipping over; one jack or support under each end of table top will not prevent tipping.

(6) Support the foot section and head section of the table top at two contact points with jacks or supports.

(7) Remove the base reducer (Refer to para 4-11).

DANGER
The table top will be separated from the column assembly after the following step. Failure to have the table top properly supported could allow the table top to tip out-of-control, resulting in serious personal injury.

(8) Remove four nuts (1, Figure 4-62) from screws (2). Do not remove screws.

DANGER
Do not press any button other than TABLE DOWN. Failure to comply could cause the table top to fall, resulting in serious personal injury.

(9) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TABLE DOWN button until the base actuator reaches the end of its travel.

NOTE
Only steps 16 thru 19 of para 4-8 need to be performed. The base actuator only needs to be disconnected from the column assembly and not removed.

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SECTION IV
MAINTENANCE / SERVICE

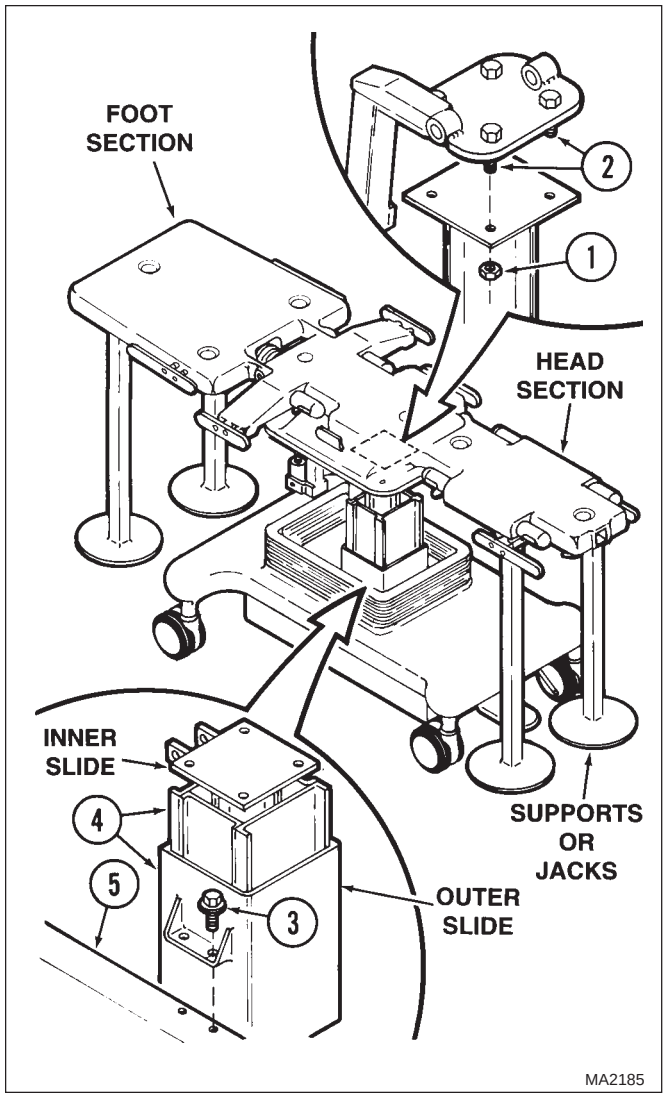

Figure 4-62. Column Assembly Removal / Installation

(10) Disconnect the base actuator from the column assembly (Refer to para 4-8).

(11) Remove four screws (3) which secure column assembly (4) to base casting (5).

DANGER

The column assembly is very heavy. Do not let fingers get between column assembly and base casting or severe pinching or cutting of fingers could result. Use proper lifting techniques to prevent back strain. If possible, use an assistant to assist in removing the column assembly.

NOTE

The column assembly should be removed from the side of the surgery table which does not contain the E-chain because the E-chain makes removal much more difficult.

(12) Remove column assembly (4) from base casting (5).

B. Installation

(1) If the column assembly is not compressed, press down on the inner slide until the column assembly is fully compressed. The inner slide may need to be taped or wired to the outer slide to prevent the column assembly from extending during installation.

DANGER

The column assembly is very heavy. Do not let fingers get between column assembly and base casting or severe pinching or cutting of fingers could result. Use proper lifting techniques to prevent back strain. If possible, use an assistant to assist in installing the column assembly.

NOTE

The column assembly should be installed from the side of the surgery table which does not contain the E-chain because the E-chain makes installation much more difficult.

(2) Install column assembly (4) in base casting (5) and secure with four screws (3).

NOTE

Only steps 2 thru 5 of para 4-8 need to be performed.

(3) Connect the base actuator to the column assembly (Refer to para 4-8).

(4) While pressing the Emergency COMPUTER CONTROL OVERRIDE SWITCH, press the TABLE UP button until the inner slide of the column assembly (4) is positioned against the table top.

(5) Insert four screws (2) down thru top plate of inner slide.

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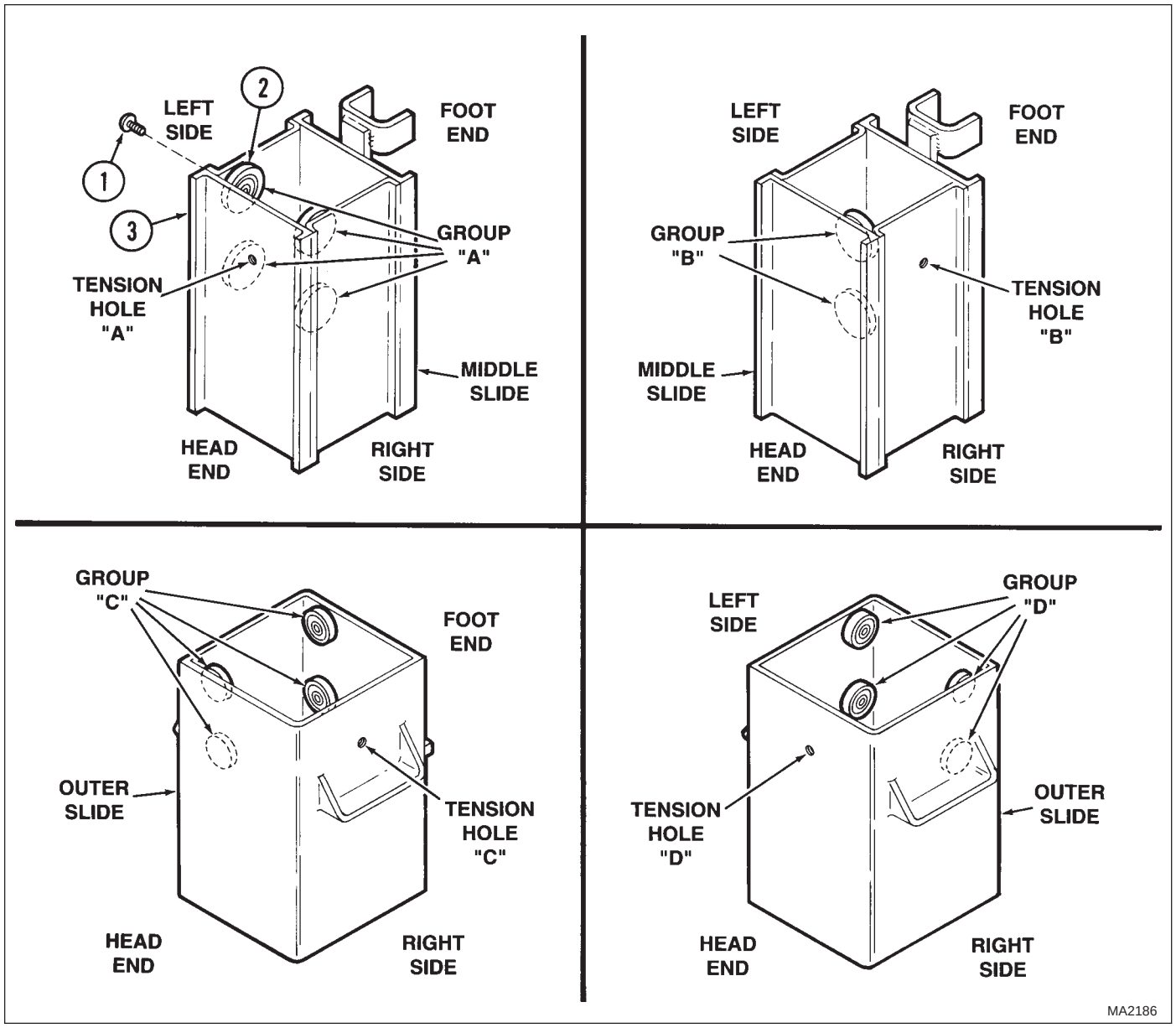

Figure 4-63. Eccentric Bearing Removal / Installation / *or* Adjustment
Use this illustration for units with Serial Numbers DN1000 thru DN1031

(6) Secure table top to column assembly (4) by installing four nuts (1) on four screws (2).

(7) Remove supports or jacks from head section and foot section of table top.

(8) Install the base reducer (Refer to para 4-11).

(9) Install the back cover (Refer to para 4-2).

(10) Raise the bellows assembly (Refer to para 4-3).

4-38. Eccentric Bearing Removal / Installation / or Adjustment

NOTE
Determine the Serial Number of your unit. Use the illustration, either Figure 4-63 or 4-64, which corresponds to your unit.

A. Removal or Adjustment

(1) Lower the bellows assembly (Refer to para 4-3).

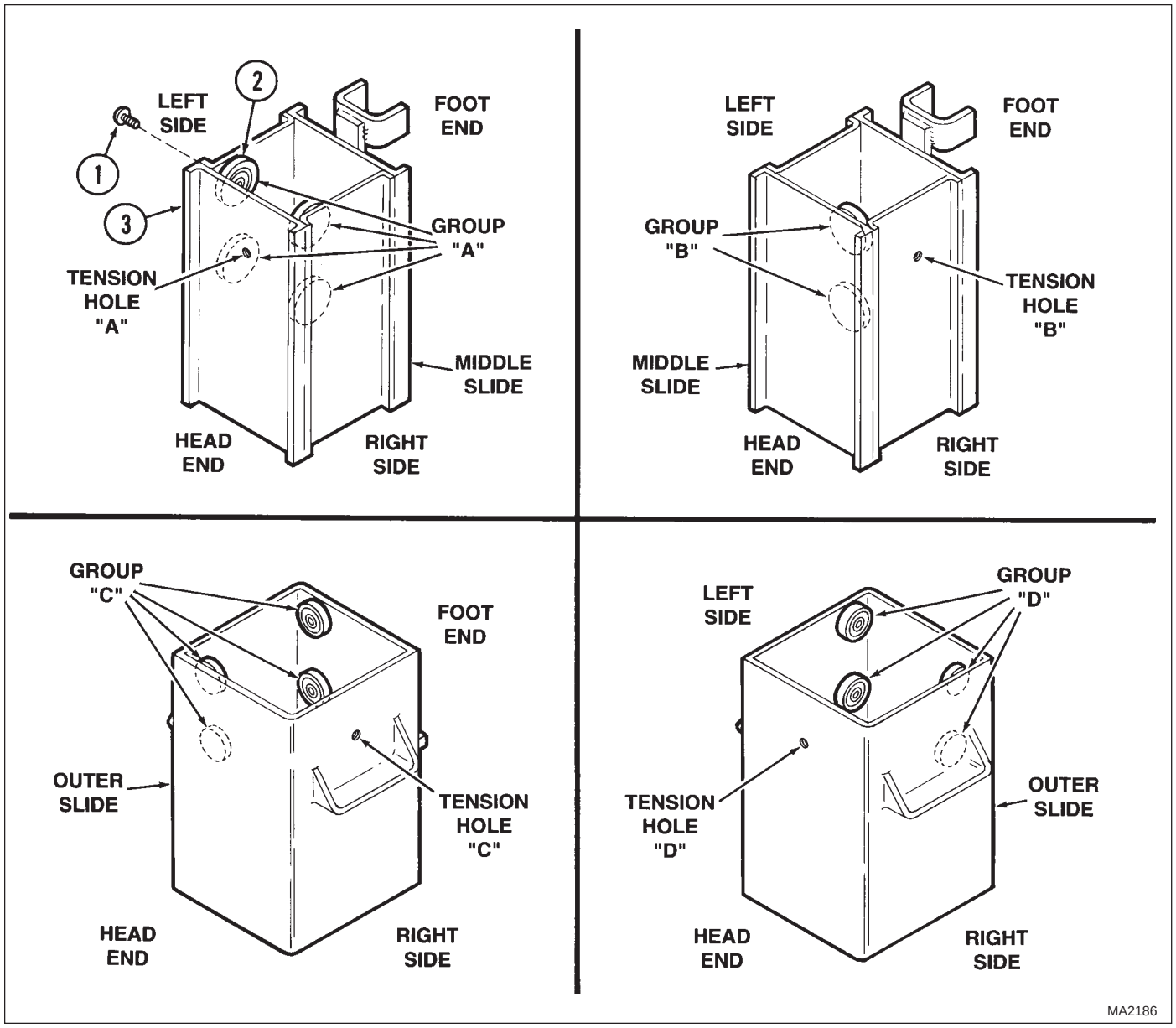

Figure 4-64. Eccentric Bearing Removal / Installation / *or* Adjustment
Use this illustration for units with Serial Numbers DN1032 thru Present

(2) Refer to Figure 4-63 or Figure 4-64 to determine what group the eccentric bearing you wish to replace/adjust is in; Group A, Group B, Group C, or Group D.

(3) Install a 5/16" - 18 bolt in the Tension Hole which matches the letter group the desired eccentric bearing is in; for Group A, bolt is installed in Tension Hole A. For Group B, bolt is installed in Tension Hole B. For Group C, bolt is installed in Tension Hole C. For Group D, bolt is installed in Tension Hole D.

(4) Tighten 5/16" - 18 bolt until tension is relieved from the eccentric bearing being replaced/ adjusted.

NOTE
If access to the eccentric bearing cannot be obtained, either lay the surgery table onto its side or remove the column assembly (Refer to para 4-37). If the eccentric bearing is only being adjusted, it does not have to be removed, just loosened.

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(5) Remove screw (1, Figure 4-63/4-64) and eccentric bearing (2) from middle slide *or* outer slide (3).

B. Installation or Adjustment

(1) Install eccentric bearing (2) on middle slide *or* outer slide (3).

NOTE
If, when performing the following step, the eccentric bearing does not become hard to rotate, too much tension is being applied with the 5/16" - 18 bolt. Loosen the bolt slightly and repeat step 2. However, be cautious, because if not enough tension is applied with the bolt, the result could be a loose column because the eccentric bearing will not press up against the slides of the column assembly hard enough after the tension bolt is removed. To check this, remove the 5/16" - 18 bolt and run the column assembly up and down. If the eccentric bearing does not rotate during the entire travel of column assembly, this is an indication that bolt tension was too loose when the eccentric bearing was installed.

(2) Rotate the eccentric bearing (2) in a counter-clockwise direction until the eccentric bearing becomes difficult to rotate. Secure the eccentric bearing (2) in position with screw (1).

(3) Remove the 5/16" - 18 bolt from Tension Hole.

(4) Raise the bellows assembly (Refer to para 4-3).

4-39. Foot Control Assembly Switch Cover (Typical) Removal / Installation

A. Removal

(1) Remove screw (1, Figure 4-65), switch cover (2), and washer (3) from foot control housing (4).

B. Installation

(1) Install washer (3) and switch cover (2) on foot control housing (4) and secure with screw (1).

4-40. Foot Control Assembly Switch (Typical) Removal / Installation

A. Removal

(1) Remove eight screws (1, Figure 4-66) from top housing (2).

(2) Remove four screws (3) and partially separate top housing (2) from bottom housing (4).

(3) Disconnect ribbon connector (5) from control interface board (6) and separate top housing (2) from bottom housing (4).

(4) Disconnect two switch wires (7) from terminals of switch (8 *or* 9).

NOTE
To remove one of the switches (8), its switch cover and washer must be removed first.

(5) Remove nut (10), starwasher (11), and switch (8 *or* 9) from top housing (2).

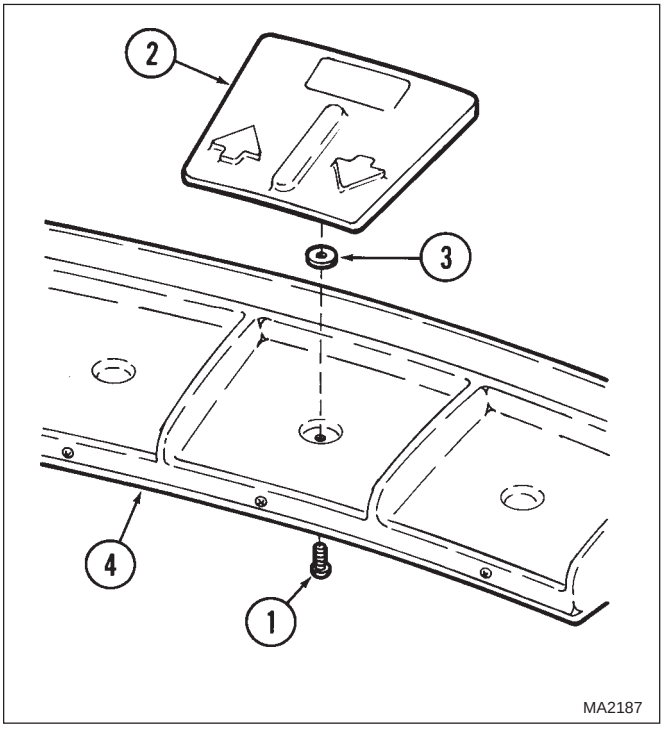

Figure 4-65. Foot Control Assembly Switch Cover Removal / Installation

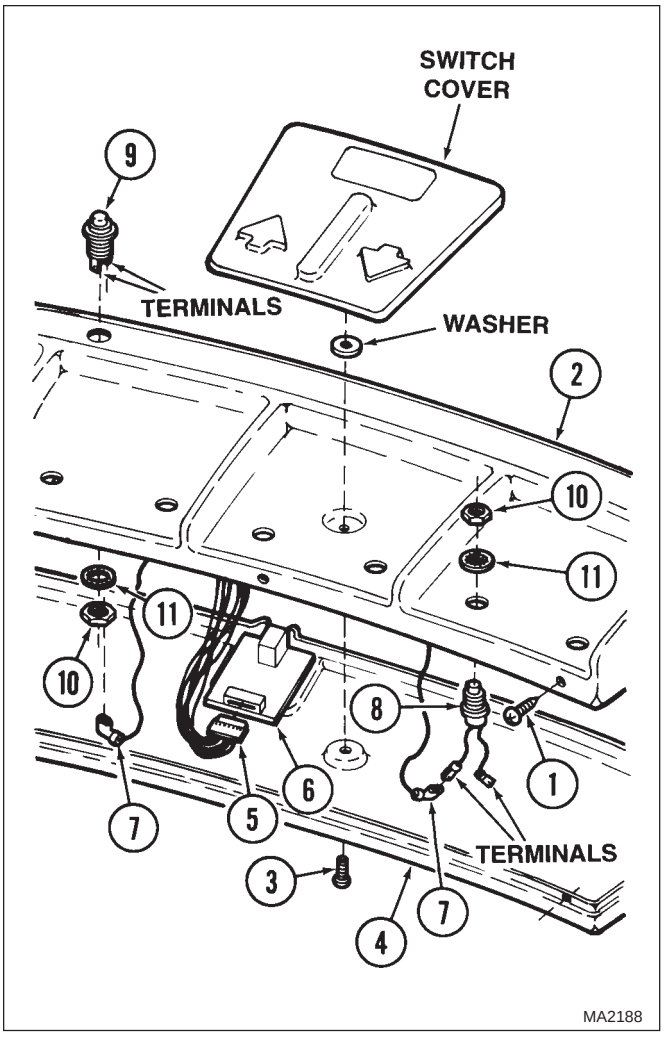

Figure 4-66. Foot Control Assembly Switch Removal / Installation

B. Installation

NOTE
To install one of the switches (8), its washer and switch cover must be re-installed on top of it.

(1) Install switch (8 *or* 9) in top housing (2) and secure with starwasher (11) and nut (10).

(2) Connect two switch wires (7) to terminals of switch (8 *or* 9).

(3) Connect ribbon connector (5) to control interface board (6).

(4) Install bottom housing (4) on top housing (2) and secure with four screws (3) and eight screws (1).

4-41. Foot Control Assembly Control Interface Board Removal / Installation

A. Removal

(1) Remove eight screws (1, Figure 4-67) from top housing (2).

(2) Remove four screws (3) and partially separate top housing (2) from bottom housing (4).

(3) Disconnect ribbon connector (5) from control interface board (6) and separate top housing (2) from bottom housing (4).

(4) Remove nut (7), lockwasher (8), screw (9), and control interface board (6) from bottom housing (4).

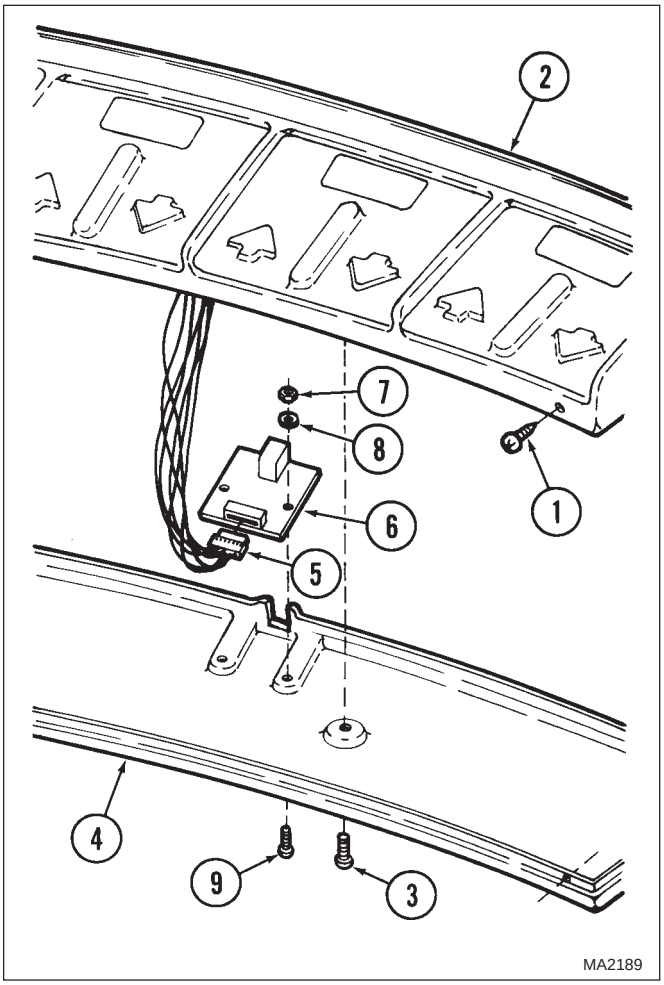

Figure 4-67. Foot Control Assembly Control Interface Board Removal / Installation

B. Installation

(1) Install control interface board (6) on bottom housing (4) and secure with screw (9), lockwasher (8) and nut (7).

(2) Connect ribbon connector (5) to control interface board (6).

(3) Position bottom housing (4) on top housing (2) and secure with four screws (3) and eight screws (1).

4-42. Articulating Headrest Assembly Adjustment

A. Adjustment

(1) If not installed already, install the articulating headrest assembly on the surgery table.

(2) Operate the surgery table to place the table top of the surgery table in a horizontal position.

CAUTION
Make sure the articulating headrest assembly is completely unlocked or the proper adjustment cannot be achieved.

(3) Turn T-handle (1, Figure 4-68) until the articulating headrest assembly is "unlocked".

(4) Pull inside end of each headlock bellows (2) off of thrust washer (3). Fold the headlock bellows (2) back out of the way.

(5) Loosen setscrew (4).

(6) Coat threads of setscrew (4) with removable threadlocking adhesive (Loctite 242).

(7) Tighten ball nut (5) until headrest handle weldment (6) begins to show resistance at Axis A, when it is rotated.

NOTE
Tightening the setscrew sometimes adds some resistance to the adjustment. If so, repeat step 8, backing the ball nut off a little farther, to prevent this.

(8) Back ball nut (5) off slightly to remove any resistance. Tighten setscrew (4).

NOTE
The headrest handle weldment should move freely without any resistance when rotated, yet no free play should be felt when the headrest handle weldment is pulled and pushed on. Resistance indicates that the ball nut was tightened too much while free play indicates that the ball nut was not tightened enough.

(9) Rotate the headrest handle weldment (6). There should be no resistance felt when rotating the headrest handle weldment. When held sideways and released, the headrest handle assembly should be able to rotate (fall) on its own and not be held by resistance. Pull and push on the headrest handle weldment. There should be no free play felt when the headrest handle weldment is pulled and pushed on. If the headrest handle weldment shows resistance or free play, repeat steps 5 thru 9 until proper adjustment is achieved.

(10) Loosen setscrew (7).

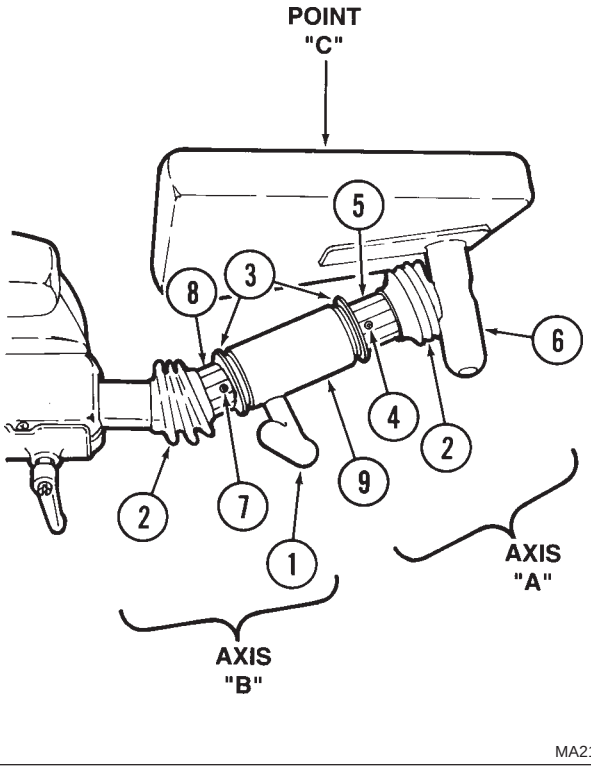

Figure 4-68. Articulating Headrest Assembly Adjustment

(11) Coat threads of setscrew (7) with removable threadlocking adhesive (Loctite 242).

NOTE
An easy way to tighten the ball nut is to hold the ball nut stationary with your hand/wrench while rotating the gearbox.

Do not overtighten ball nut so that a nurse or doctor will not be able to move Axis B of the articulating headrest assembly comfortably.

(12) Tighten ball nut (8) until gearbox (9) can still be rotated about Axis B, but so that a significant force must be exerted on it to do so.

NOTE
Tightening the setscrew sometimes adds resistance to the adjustment. If so, repeat step 12, backing the ball nut off a little before tightening the setscrew, to prevent this.

(13) Tighten setscrew (7).

(14) Move the back section of the table top and the articulating headrest assembly to a horizontal position.

(15) Turn the T-handle (1) until hand tight.

DANGER
Do not allow an articulating headrest assembly to be returned to service if it fails the static load test in step 16. Failure to do so could result in severe injury or death to a patient if the articulating headrest assembly failed during a surgical procedure.

(16) Using a spring scale or weights, measure the static load capacity of the articulating headrest assembly at Point C. The articulating headrest assembly must be capable of holding up a static load of 80 - 100 lbs (36.3 - 45.4 kg) without allowing movement at axis A and/or axis B. If the articulating headrest assembly cannot hold up the test static load, repeat the entire adjustment procedure. If the proper adjustment still cannot be achieved, return the articulating headrest assembly to Midmark Corporation for repair.

(17) Pull the inside end of each headlock bellows (2) over its thrust washer (3).

4-43 IsolationTransformer Removal / Installation (Export Units Only)

A. Removal

(1) Disconnect electrical power from surgery table.

NOTE
It may become necessary to lay the table onto its side to perform the following steps. Also, the throw rod may need to be disconnected in order to remove some of the screws in the following step.

(2) Remove six screws (1, Figure 4-69) and outer shroud (2) from base casting (3).

(3) Disconnect transformer wire harness (4) from wire harness (5).

NOTE
Cut cable ties as necessary during the following step.

(4) Remove four screws (6) and isolation transformer (7) from base casting (3).

B. Installation

(1) Install isolation transformer (7) on base casting (3) and secure with four screws (6).

(2) Connect transformer wire harness (4) to wire harness (5).

(3) Install outer shroud (2) on base casting (3) and secure with six screws (1).

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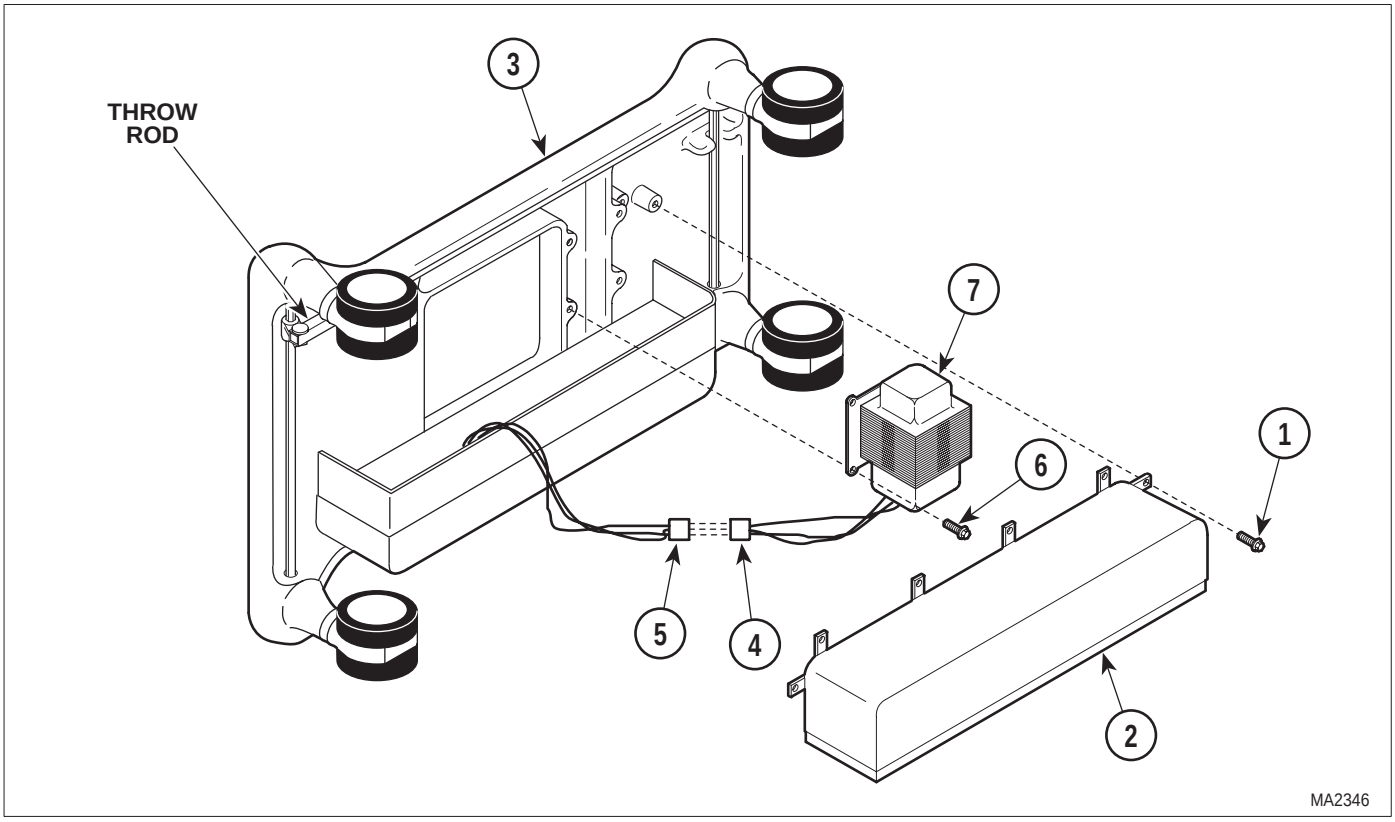

Figure 4-69. Isolation Transformer Removal / Installation

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SECTION V
SCHEMATICS , CHARTS, AND DIAGRAMS

5-1. Audible Signal Guide Chart

Table 5-1 lists all of the audible signals that can be emitted by the surgery table and the purpose/meaning for each audible signal.

Table 5-1. Audible Signal Guide Chart

Audible Signal	Purpose of Audible Signal
Single beep	When the operator is using one of the eight programmed position buttons, a single beep informs the operator that the programmed position has been reached.
	When the ENABLE button is pressed by the operator, a single beep informs the operator that surgery table was "enabled."
Double beep	When a PC control board calibration procedure has just been performed, and the operator presses the ENABLE button, a double beep informs the operator that the calibration was not accepted by the PC control board.
Slow beep (five seconds maximum)	When the operator presses and holds the PROGRAM button for two seconds, a slow beep lasting five seconds informs the operator that the PROGRAM mode is enabled. If one of the eight program POSITION buttons are pressed within 10 seconds, the surgery table's present position will be stored in memory.
Intermittent beep (one second on, four seconds off)	Informs the operator/maintenance technician that the voltage level of the power source for the surgery table is below 95 VAC.
Fast beep (continuous as long as a single function button or programmed POSITION button continues to be pressed; it stops when the button is released.)	When the operator presses a single function button, but the function does not move or moves too slowly, a continuous fast beep informs the operator of the problem. (The fast beep is continuous as long as a single function button or programmed POSITION button continues to be pressed; it stops when the button is released.)
	When the operator presses a single function button, but the function will not start due to overload or malfunction, a continuous fast beep informs the operator of the problem. (The fast beep is continuous as long as a single function button continues to be pressed; it stops when the button is released.)
	When the operator presses a single function button, but the function is at the end of its travel, a continuous fast beep informs the operator that the function is at the end of its travel. (The fast beep is continuous as long as a single function button continues to be pressed; it stops when the button is released.)
One Second Interval Beep (continuous as long as a single function button or programmed position button continues to be pressed; it stops when the button is released.)	When the operator presses a single function button and its function moves properly, but another function that is presently not being used has a transducer malfunction, a one second interval beep informs the operator that one of transducers for the other four functions is malfunctioning.
	When the operator presses one of the programmed POSITION buttons and one of the functions has a transducer malfunction or is not moving properly, a one second interval beep informs the operator that one of the functions has a malfunction.
Buzz (one second in length.)	When the operator turns the POWER ON / OFF switch to OFF, a one second buzz informs the operator that power has been removed from the surgery table.
	If the surgery table power source is interrupted or fails, a one second buzz informs the operator that power to the surgery table has failed.
Solid tone (continuous)	Informs the operator/maintenance technician that the PC control board is malfunctioning. The PC control board can be reset by turning POWER ON / OFF switch to OFF, waiting 20 seconds, and then turning the POWER ON / OFF switch to ON. If the continuous solid tone persists, the PC control board needs

SECTION V
SCHEMATICS AND DIAGRAMS

Table 5-1. Audible Signal Guide Chart - Continued

Audible Signal	Purpose of Audible Signal
Chirping (continuous as long as a single function button continues to be pressed; it stops when the button is released.)	When the operator presses a single function button and moves the table into a mechanical collision situation, the function will stop and a continuous chirping informs the operator that the PC control board has shut down the function to prevent a mechanical collision. To continue, move the function out of the collision situation.
Fast Chirping (one second in length.)	When the operator presses a programmed POSITION button (1 - 8) that has not been programmed with a position, a fast chirping informs the operator that no position has been programmed for that particular POSITION button.
	When the operator presses a programmed POSITION or PROGRAM button that is malfunctioning, a fast chirping informs the operator that the PC control board is malfunctioning.

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5-2. Electrical Schematic / Wiring Diagram

Figure 5-1 illustrates the logic/current flow and the wiring connections between the electrical components in the domestic surgery table. Figure 5-2 illustrates the logic/current flow and the wiring connections between the electrical components in the export surgery table.

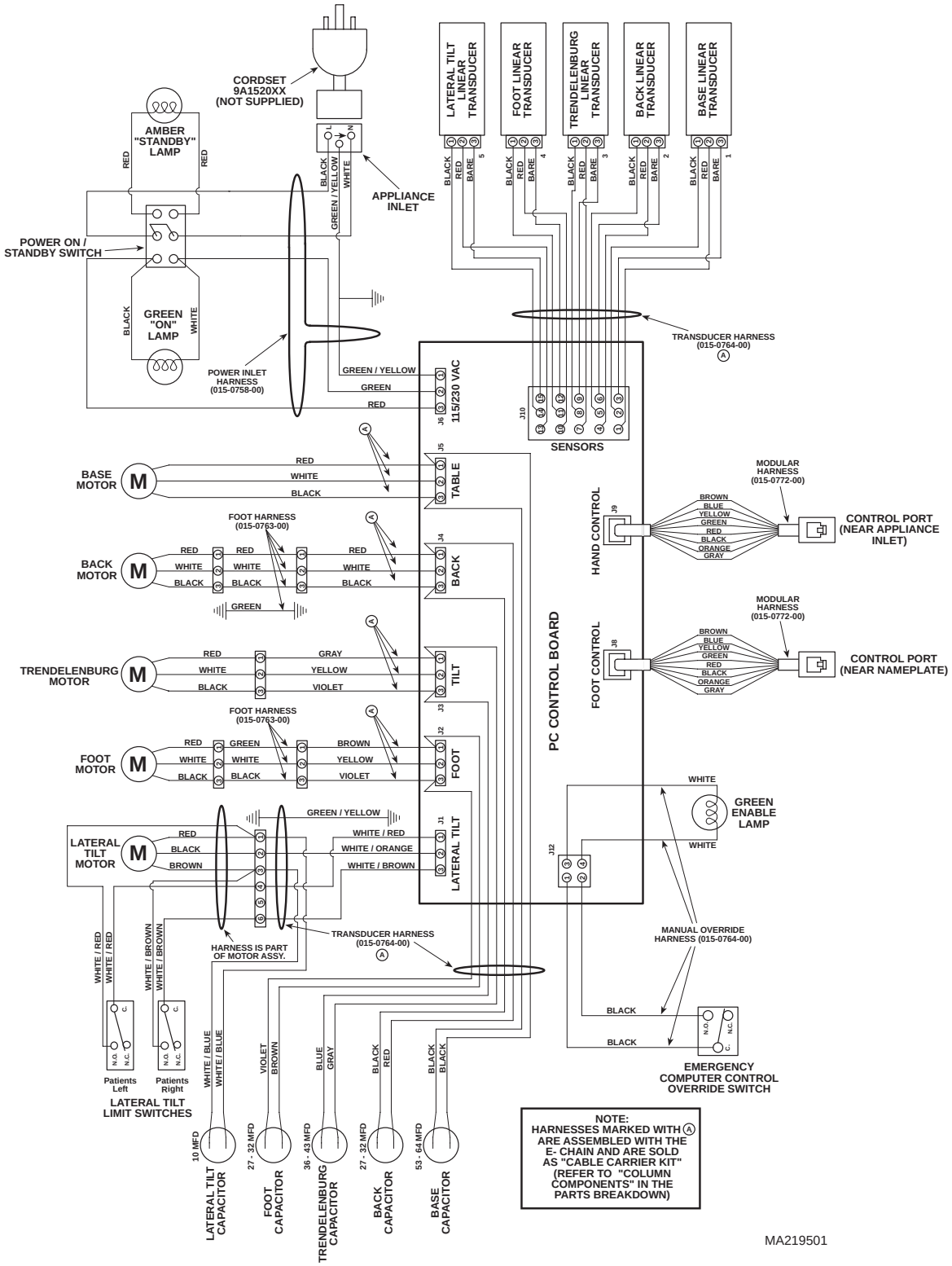

Figure 5-1. Domestic Electrical Schematic / Wiring Diagram

SECTION V
SCHEMATICS AND DIAGRAMS

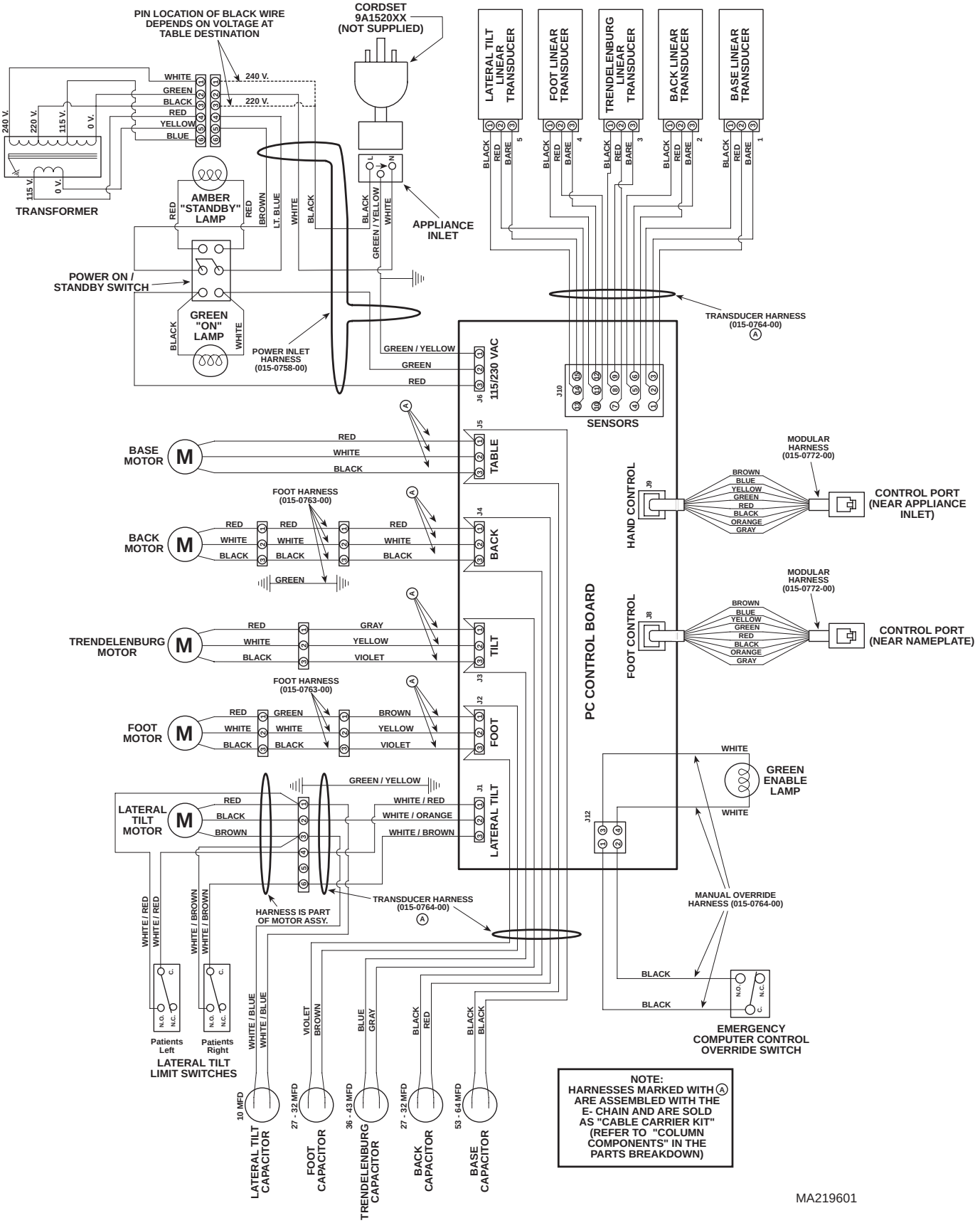

Figure 5-2. Export Electrical Schematic / Wiring Diagram

5-3. Column Assembly Operation

Figure 5-3 illustrates how the column assembly extends and retracts using leaf chains.

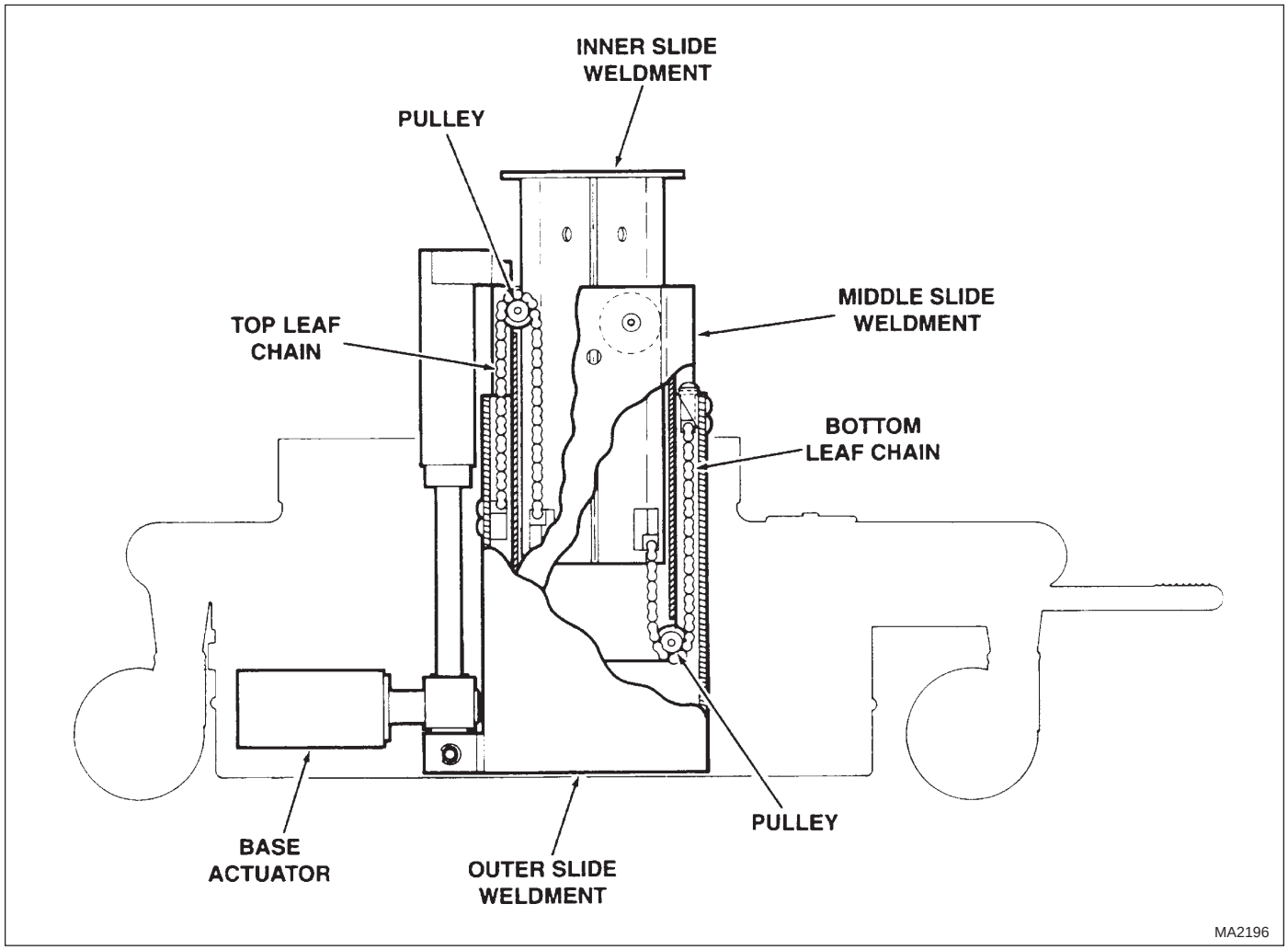

Figure 5-3. Column Assembly Operation

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SECTION VI
PARTS LIST

6-1 Introduction

The illustrated parts list provides information for identifying and ordering the parts necessary to maintain the unit in peak operating condition. Refer to paragraph 1-5 for parts ordering information.

The parts list also illustrates disassembly and assembly relationships of parts.

6-2 Description of Columns

The *Item* column of the parts list gives a component its own unique number. The same number is given to the component in the parts illustration. This allows a part number of a component to be found if the technician can visually spot the part on the illustration. The technician simply finds the component in question on the illustration and notes the item number of that component. Then, he finds that item number in the parts list. The row corresponding to the item number gives the technician the part number, a description of the component, and quantity of parts per subassembly. Also, if a part number is known, the location of that component can be determined by looking for the item number of the component on the illustration.

The *Part No.* column lists the MIDMARK part number for that component.

The *Description* column provides a physical description of the component.

The *Qty.* column lists the number of units of a particular component that is required for the subassembly. The letters “AR” denote “as required” when quantities of a particular component cannot be determined, such as: adhesive.

Bullets [•] in the *Part No.* column and the *Description* column show the indenture level of a component. If a component does not have a bullet, it is a main component of that illustration. If a component has a bullet, it is a subcomponent of the next component listed higher in the parts list than itself that does not have a bullet. Likewise, if a component has two bullets, it is a subcomponent of the next component listed higher in the parts list than itself that has only one bullet.

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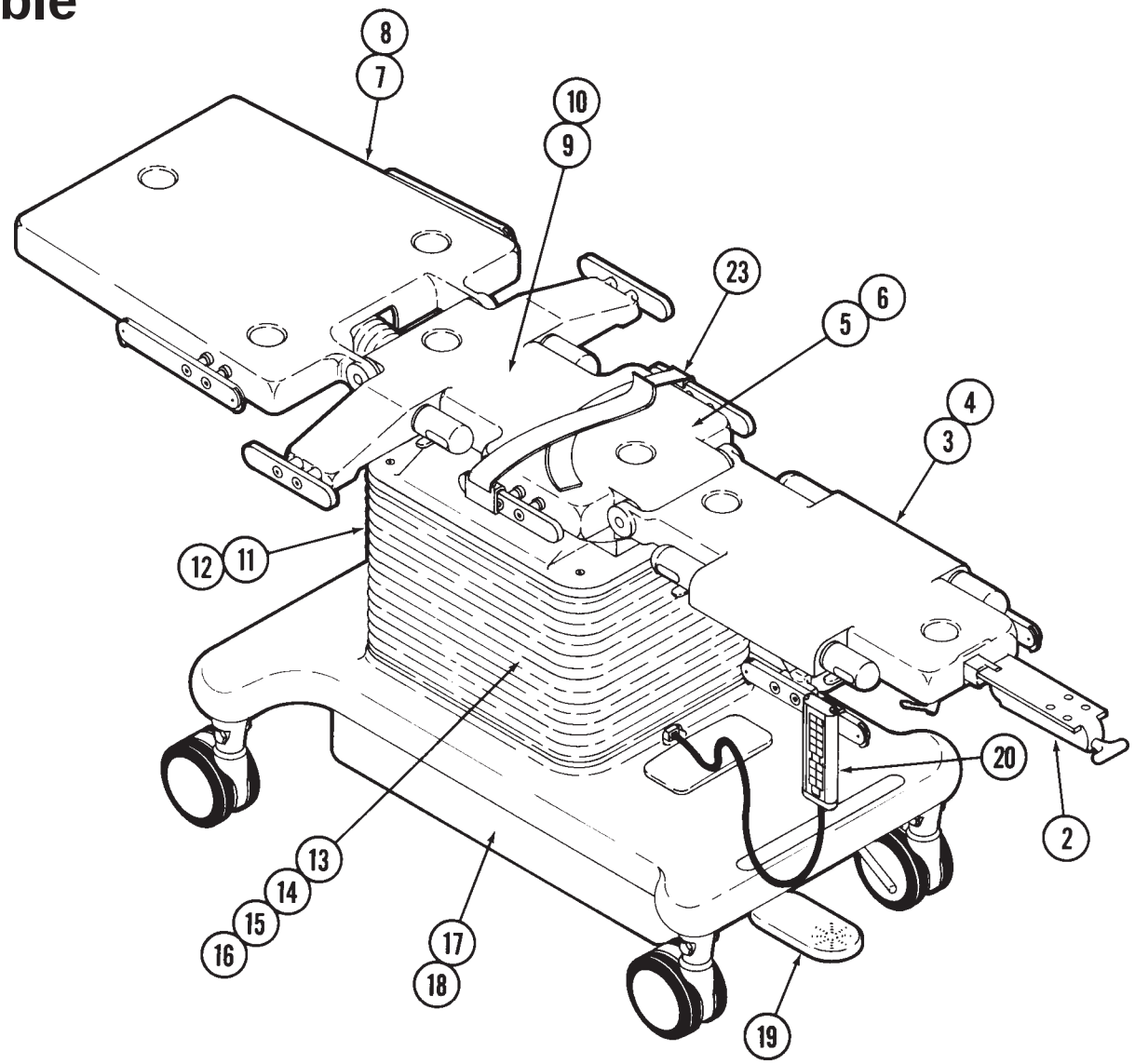
712 Power Plastic Surgery Table



MA2118

Used on units with Serial Number DN1000 thru DN1041 & DZ1000 thru DZ1002

Item	Part No.	Description	Page
	712	Power Plastic Surgery Table (Includes Items 1 thru 21)	6-2
1	• 002-0352-xx	• Upholstery Set (Not Shown)	6-3
2	• 9A183001	• Ratchet Headrest	6-26
3	•	• Back Assembly	6-5
4	• • 002-0383-00	• •Back Actuator Assembly	6-6
5	•	• Seat Assembly	6-7
6	•	• Seat Transducer Components	6-8
7	•	• Foot Assembly	6-9
8	• • 002-0385-00	• • Foot Actuator Assembly	6-10
9	•	• Lateral Tilt Mechanism	6-11
10	• •	• • Lateral Tilt Drive Components	6-12
11	•	• Trendelenburg Components	6-13
12	• • 002-0384-00	• • Trendelenburg Actuator Assy.	6-14
13	•	• Column Components	6-15
14	• •	• • Column Assembly	6-16
15	• •	• • Base Actuator Assembly	6-17
16	• • 029-1507-00	• • Base Reducer Assembly	6-18
17	•	• Base Electrical Components	6-19
18	• •	• • Electrical Panel	6-20
19	•	• Brake Components	6-21
20	• 029-1494-00	• Hand Control Assembly	6-22
21	• 003-0592-00	• Installation/Operation Manual{*}	(N/S)
		OPTIONAL ACCESSORIES	
		Refer to MEDICAL ACCESSORY BOOK {004-0096-00}	
22	9A161001	Articulating Headrest Assembly	9A161
23	9A176001	Articulating Armboard Assembly	9A176
24	9A177001	Foot Control Assembly	9A177
25	9A178001	Restraint Belt Assembly {*}	9A178

{*}- Denotes "No Breakdown Page Available"

Always Specify Model & Serial Number

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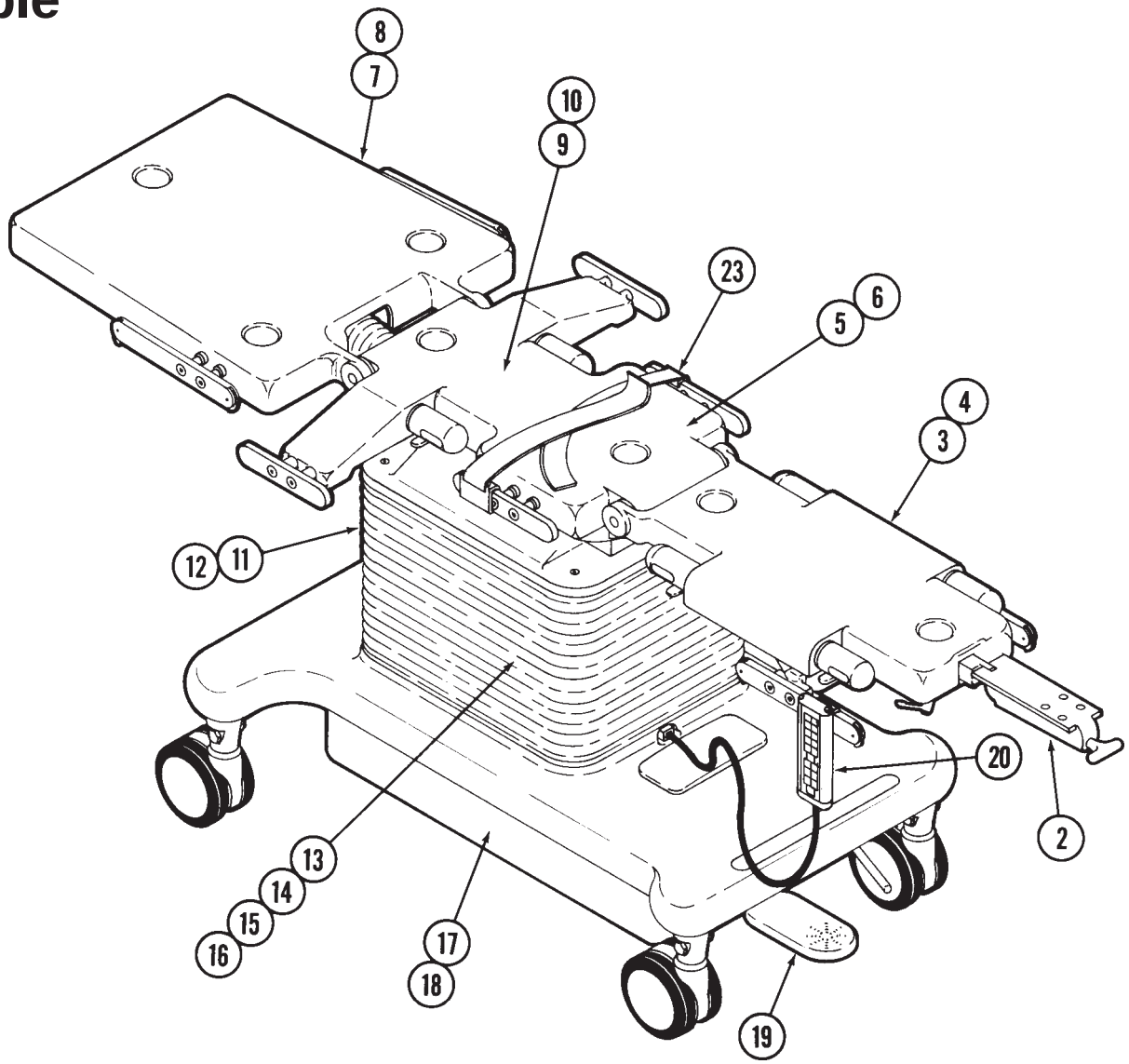
712 Power Plastic Surgery Table



MA2118

Used on units with Serial Number DN1042 & DZ1003 thru Present

Item	Part No.	Description	Page
	712	Power Plastic Surgery Table (Includes Items 1 thru 21)	6-2
1	• 002-0426-XX	• Upholstery Set (Not Shown)	6-3
2	• 9A161001	• Articulating Headrest Assm.	6-4
3	•	• Back Assembly	6-5
4	• • 002-0383-00	• •Back Actuator Assembly	6-6
5	•	• Seat Assembly	6-7
6	•	• Seat Transducer Components	6-8
7	•	• Foot Assembly	6-9
8	• • 002-0385-00	• • Foot Actuator Assembly	6-10
9	•	• Lateral Tilt Mechanism	6-11
10	• •	• • Lateral Tilt Drive Components	6-12
11	•	• Trendelenburg Components	6-13
12	• • 002-0384-00	• • Trendelenburg Actuator Assm.	6-14
13	•	• Column Components	6-15
14	• •	• • Column Assembly	6-16
15	• •	• • Base Actuator Assembly	6-17
16	• • 029-1507-00	• • Base Reducer Assembly	6-18
17	•	• Base Electrical Components	6-19
18	• •	• • Electrical Panel	6-20
19	•	• Brake Components	6-21
20	• 029-1494-00	• Hand Control Assembly	6-22
21	• 003-0592-00	• Installation/Operation Manual{*}	(N/S)
		OPTIONAL ACCESSORIES	
		Refer to MEDICAL ACCESSORY BOOK {004-0096-00}	
22	9A176001	Articulating Armboard Assembly	9A176
24	9A177001	Foot Control Assembly	9A177
25	9A178001	Restraint Belt Assembly {*}	9A178
26	9A17900X	Fixed Armboard Assembly	9A179
26	9A183001	Ratchet Headrest	9A183

{*}- Denotes "No Breakdown Page Available"

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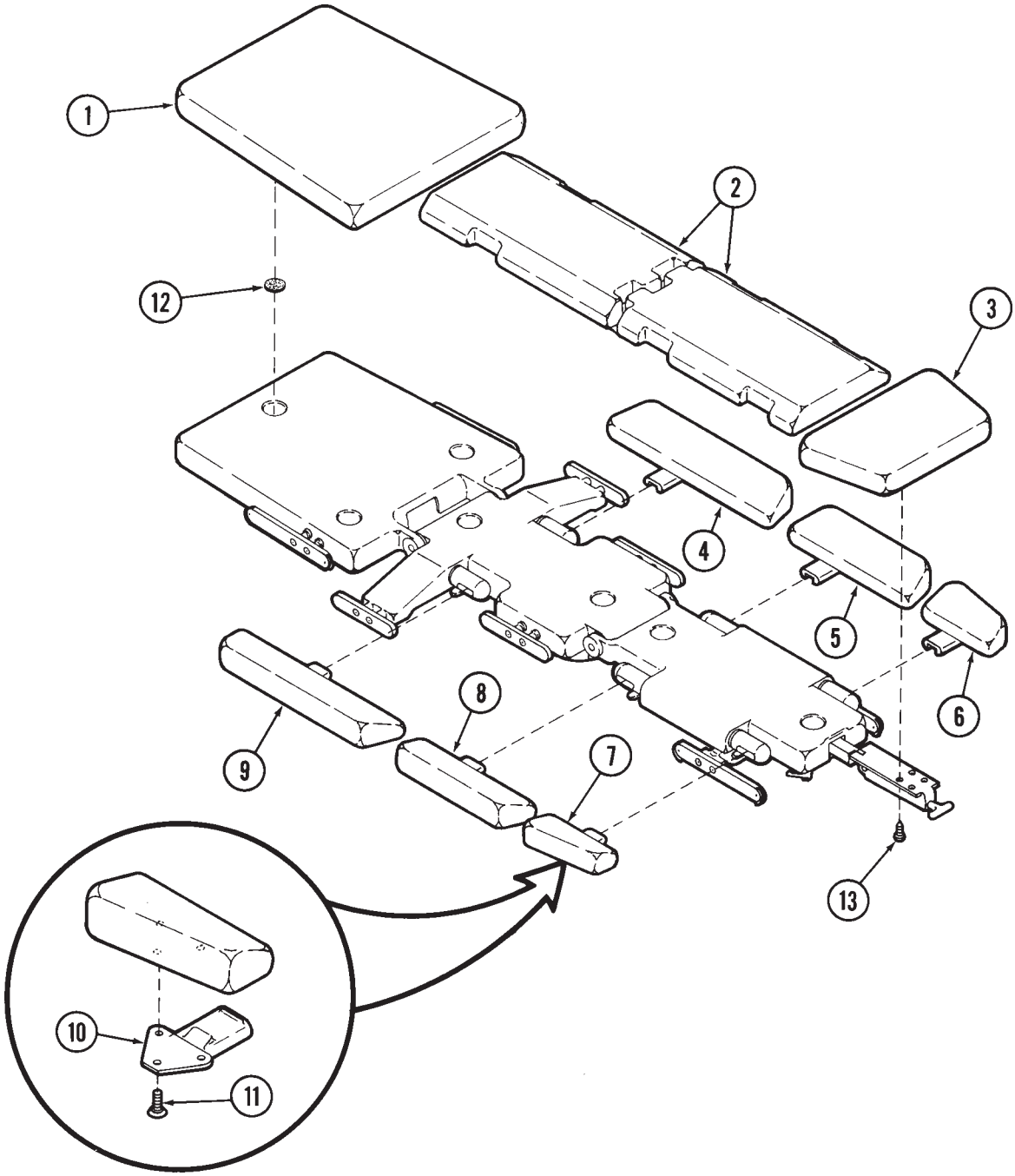
Upholstery Set



MA2102

Used on units with Serial Number DN1000 thru DN1041 & DZ1000 thru DZ1002

Item	Part No.	Description	Qty.
	002-0352-xx	Upholstery Set (Includes Items 1 thru 11) {Specify Color -01 = Blk. , -02 = Grey and -03 = Blue }	1
1	• 028-0308-xx	• Foot Upholstery (Specify Color)	1
2	• 028-0307-xx	• Seat/Back Upholstery (Specify Color)	1
3	• 028-0315-xx	• Headrest Upholstery (Specify Color)	1
4	• 028-0310-xx	• Right Seat Wing (Specify Color)	1
5	• 028-0312-xx	• Right Kidney Wing (Specify Color)	1
6	• 028-0314-xx	• Right Shoulder Wing (Specify Color)	1
7	• 028-0313-xx	• Left Shoulder Wing (Specify Color)	1
8	• 028-0311-xx	• Left Kidney Wing (Specify Color)	1
9	• 028-0309-xx	• Left Seat Wing (Specify Color)	1
10	• 020-0124-00	• Wing Stem	6
11	• 040-0250-115	• Screw	18
12	053-0131-28	Velcro Hook Tape	7
13	040-0250-76	Screw	4

Always Specify Model & Serial Number

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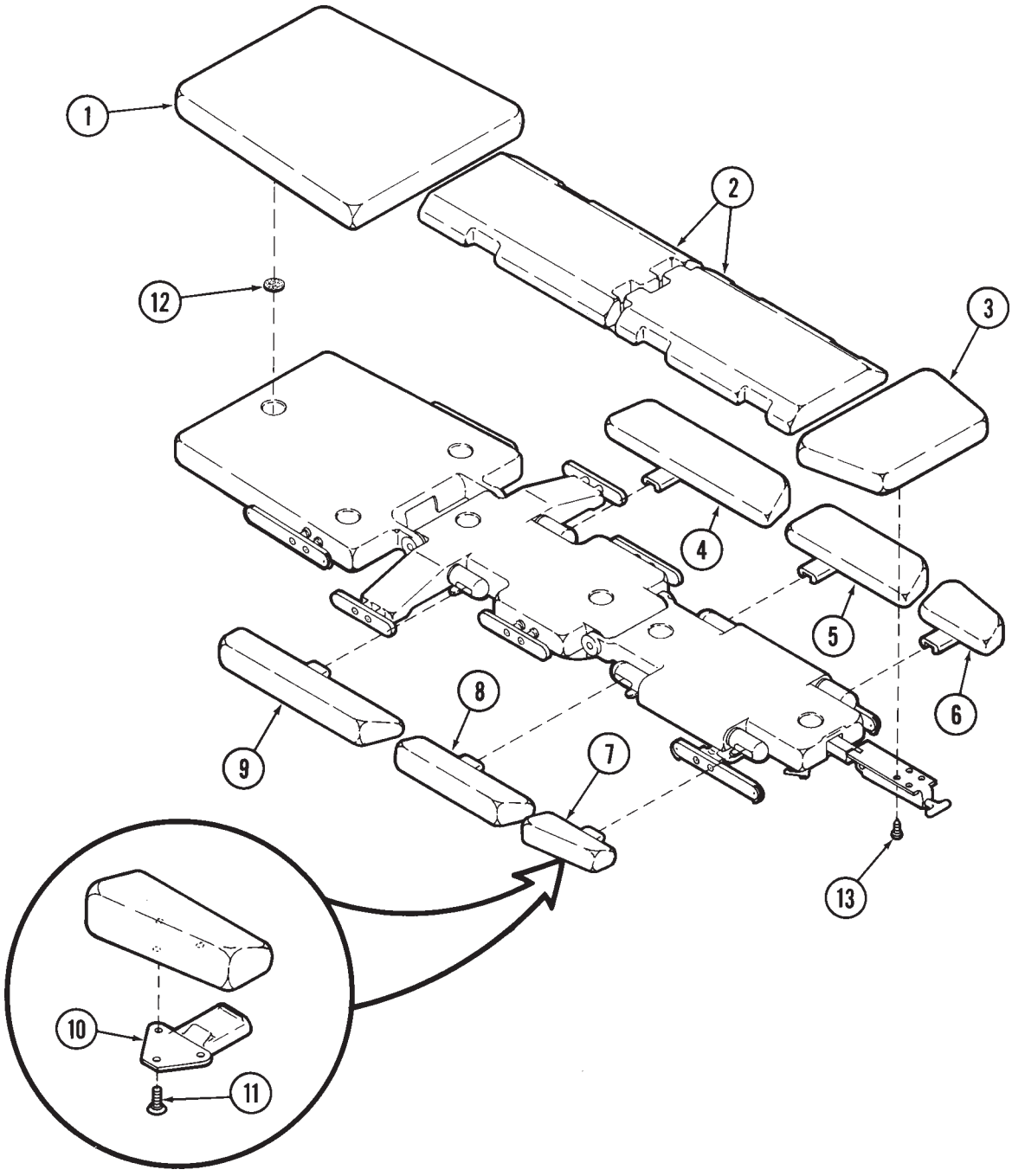
Upholstery Set



MA2102

Used on units with Serial Number DN1042 & DZ1003 thru Present

Item	Part No.	Description	Qty.
	002-0426-xx	Upholstery Set (Includes Items 1 thru 11) {Specify Color -01 = Blk. , -02 = Grey and -03 = Blue }	1
1	• 028-0308-xx	• Foot Upholstery (Specify Color)	1
2	• 028-0307-xx	• Seat / Back Upholstery (Specify Color)	1
3	• 028-0317-xx	• Headrest Upholstery (Specify Color)	1
4	• 028-0310-xx	• Right Seat Wing (Specify Color)	1
5	• 028-0312-xx	• Right Kidney Wing (Specify Color)	1
6	• 028-0314-xx	• Right Shoulder Wing (Specify Color)	1
7	• 028-0313-xx	• Left Shoulder Wing (Specify Color)	1
8	• 028-0311-xx	• Left Kidney Wing (Specify Color)	1
9	• 028-0309-xx	• Left Seat Wing (Specify Color)	1
10	• 020-0124-00	• Wing Stem	6
11	• 040-0250-115	• Screw	18
12	053-0131-28	Velcro Hook Tape	7
13	040-0250-77	Screw	4

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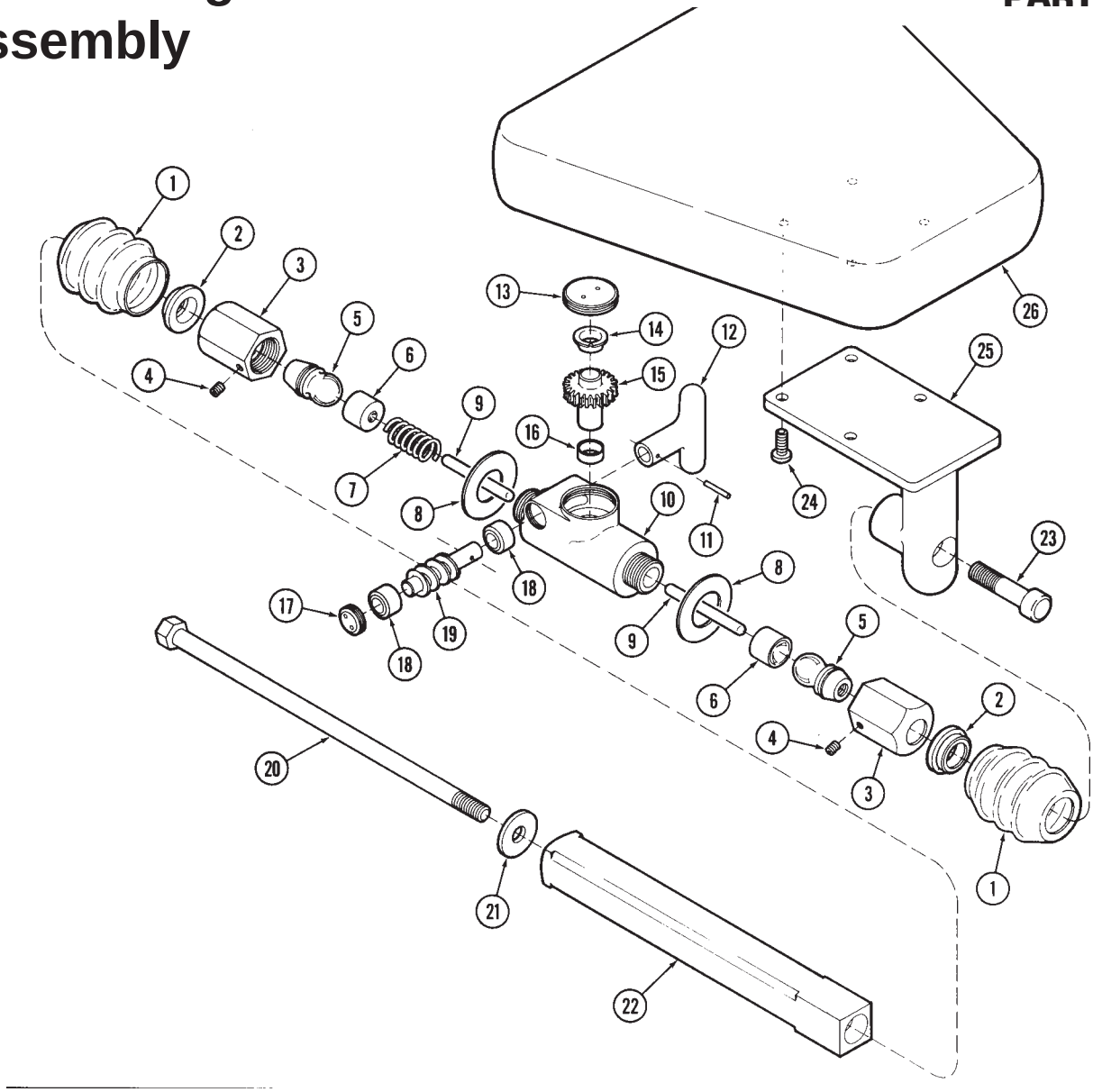
Articulating Headrest Assembly



MA2120

Used on units built prior to 12-01-92.

Item	Part No.	Description	Qty.
	9A161001	Articulating Headrest Assembly (Includes Items 1 thru 25)	1
1	• 053-0438-00	• Headlock Bellows	2
2	• 053-0461-00	• Slip Ring	2
3	• 051-0686-00	• Hex Ball Nut	2
4	• 040-0250-75	• Set Screw	2
5	• 057-0312-00	• Tapered Attachment Ball	2
6	• 057-0368-00	• Piston	2
7	• 025-0042-04	• Compression Spring	1
8	• 016-0195-02	• Thrust Washer	2
9	• 057-0313-00	• Connecting Rod	2
10	• 020-0131-10	• Headlock Gearbox	1
11	• 042-0001-24	• Roll Pin	1
12	• 020-0130-00	• T-Handle	1
13	• 057-0309-00	• Gear Nut	1
14	• 016-0392-06	• Flanged Bushing	1
15	• 057-0315-00	• Gearshaft	1
16	• 016-0076-14	• Bushing	1
17	• 057-0310-00	• Worm Nut	1
18	• 053-0462-00	• Worm Bearing	2
19	• 057-0311-00	• Wormshaft	1
20	• 040-0500-10	• Screw	1
21	• 045-0001-51	• Washer	1
22	• 051-0685-00	• Male Bar	1
23	• 040-0500-09	• Screw	1
24	• 040-0250-77	• Screw	4
25	• 030-0782-10	• Headrest Handle Weldment	1
26	028-0317-0X	Headrest Upholstery-Standard (Shown) {Specify Color}	1
	002-0403-0X	Headrest Upholstery-6" Round (Shown) {Specify Color}	1
	002-0404-0X	Headrest Upholstery-V Shaped (Shown) {Specify Color}	1

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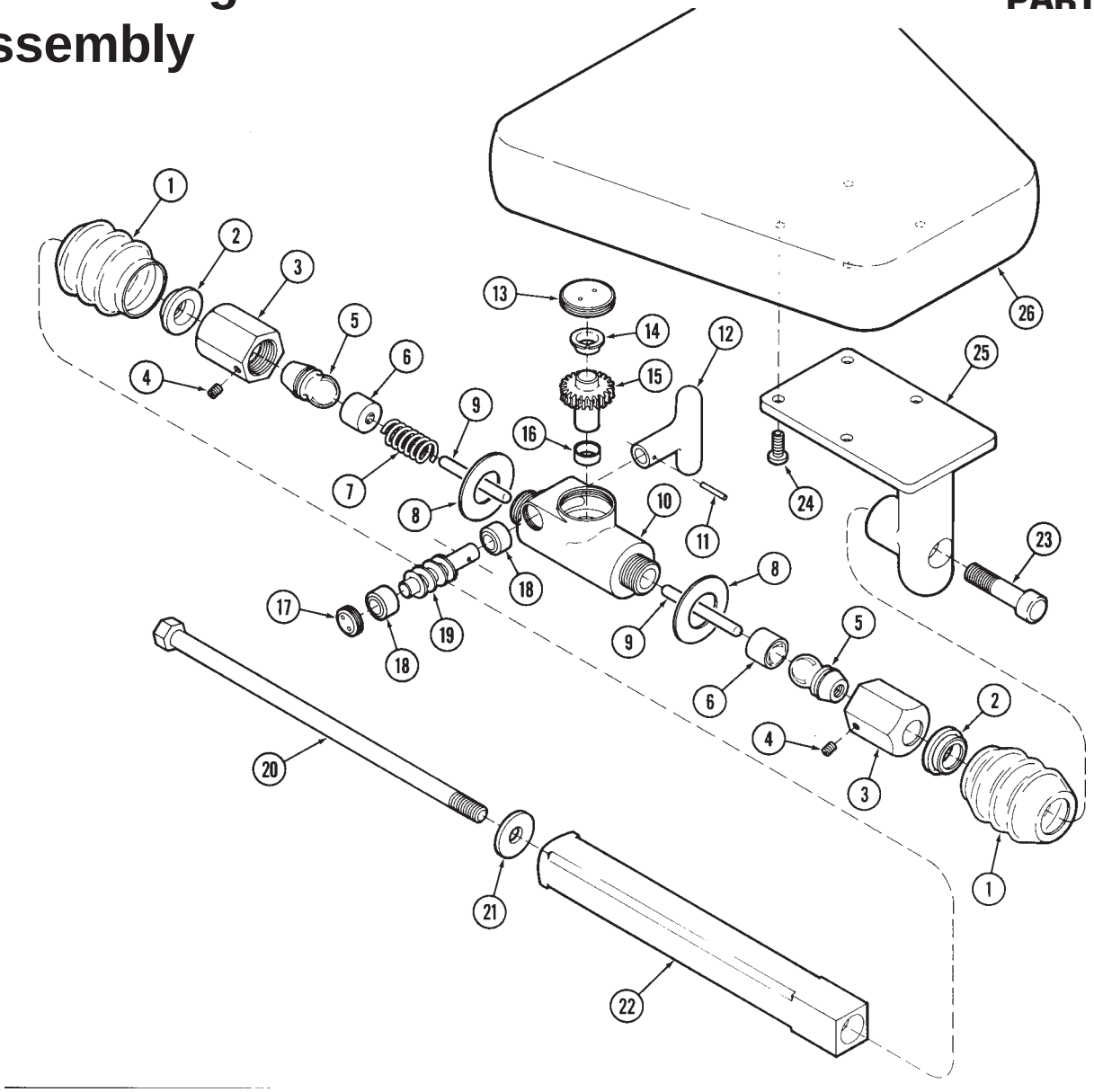
Articulating Headrest Assembly



MA2120

Used on units built from 12-02-92 thru 7-14-93.

Item	Part No.	Description	Qty.
	9A161001	Articulating Headrest Assembly (Includes Items 1 thru 25)	1
1	• 053-0438-00	• Headlock Bellows	2
2	• 053-0461-00	• Slip Ring	2
3	• 051-0686-00	• Hex Ball Nut	2
4	• 040-0250-75	• Set Screw	2
5	• 057-0312-00	• Tapered Attachment Ball	2
6	• 057-0368-00	• Piston	2
7	• 025-0042-04	• Compression Spring	1
8	• 016-0195-02	• Thrust Washer	2
9	• 057-0313-00	• Connecting Rod	2
10	• 020-0131-10	• Headlock Gearbox	1
11	• 042-0002-13	• Roll Pin	1
12	• 020-0130-00	• T-Handle	1
13	• 057-0309-00	• Gear Nut	1
14	• 016-0392-06	• Flanged Bushing	1
15	• 057-0315-00	• Gearshaft	1
16	• 016-0076-14	• Bushing	1
17	• 057-0310-00	• Worm Nut	1
18	• 053-0462-00	• Worm Bearing	2
19	• 057-0311-00	• Wormshaft	1
20	• 040-0500-10	• Screw	1
21	• 045-0001-51	• Washer	1
22	• 051-0685-00	• Male Bar	1
23	• 040-0500-09	• Screw	1
24	• 040-0250-77	• Screw	4
25	• 030-0782-10	• Headrest Handle Weldment	1
26	028-0317-0X	Headrest Upholstery-Standard (Shown) {Specify Color}	1
	002-0403-0X	Headrest Upholstery-6" Round (Shown) {Specify Color}	1
	002-0404-0X	Headrest Upholstery-V Shaped (Shown) {Specify Color}	1

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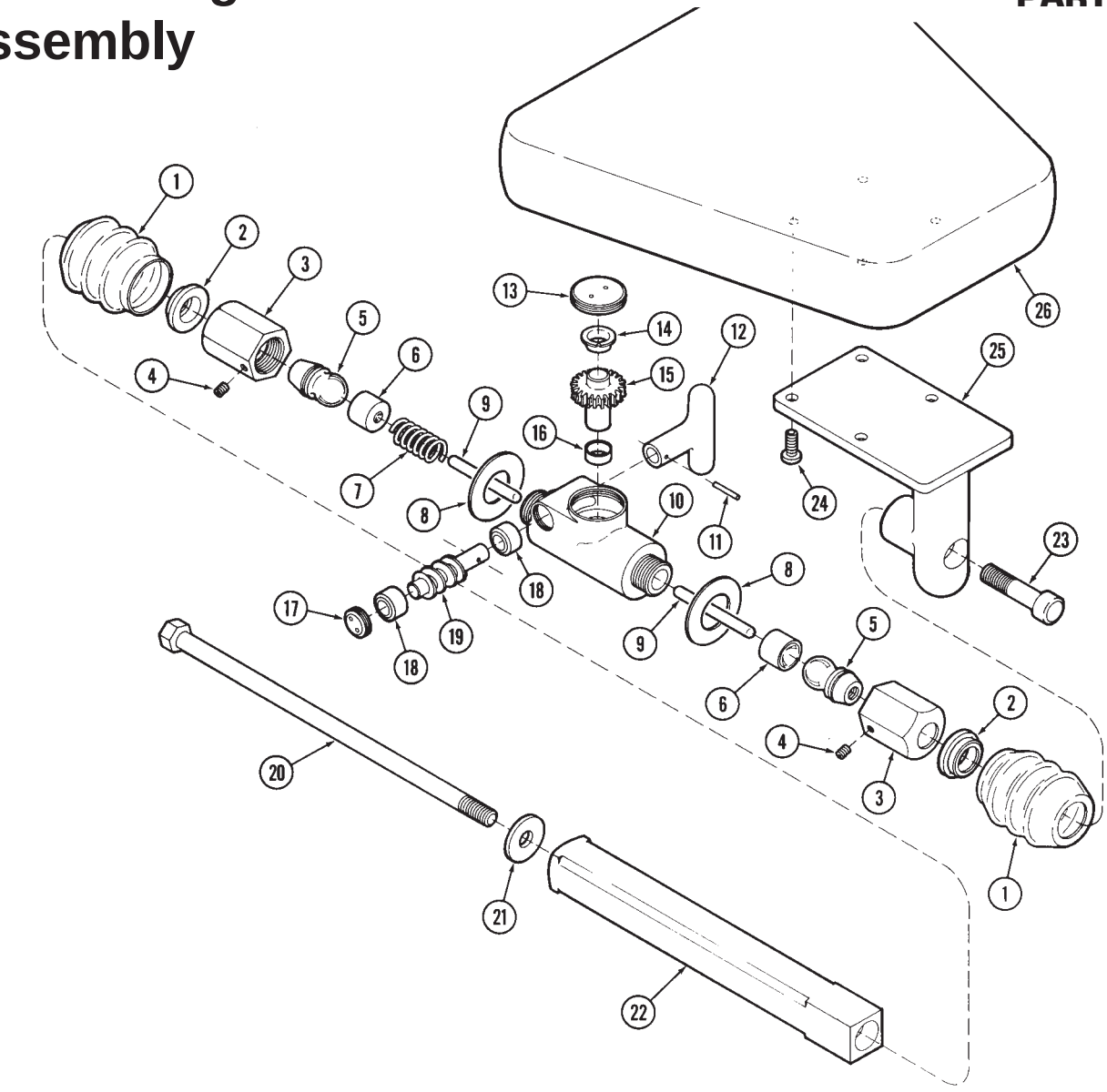
Articulating Headrest Assembly



MA2120

Used on units built from 7-15-93 thru present.

Item	Part No.	Description	Qty.
	9A161001	Articulating Headrest Assembly (Includes Items 1 thru 25)	1
1	• 053-0438-00	• Headlock Bellows	2
2	• 053-0461-00	• Slip Ring	2
3	• 051-0686-00	• Hex Ball Nut	2
4	• 040-0250-75	• Set Screw	2
5	• 057-0312-00	• Tapered Attachment Ball	2
6	• 057-0368-00	• Piston	2
7	• 025-0042-04	• Compression Spring	1
8	• 016-0195-02	• Thrust Washer	2
9	• 057-0313-00	• Connecting Rod	2
10	• 020-0131-00	• Headlock Gearbox	1
11	• 042-0001-11	• Roll Pin	1
12	• 020-0151-00	• T-Handle	1
13	• 057-0309-00	• Gear Nut	1
14	• 016-0392-06	• Flanged Bushing	1
15	• 057-0315-00	• Gearshaft	1
16	• 016-0076-14	• Bushing	1
17	• 057-0310-00	• Worm Nut	1
18	• 053-0462-00	• Worm Bearing	2
19	• 057-0378-00	• Wormshaft	1
20	• 040-0500-10	• Screw	1
21	• 045-0001-51	• Washer	1
22	• 051-0685-00	• Male Bar	1
23	• 040-0500-09	• Screw	1
24	• 040-0250-77	• Screw	4
25	• 030-0782-10	• Headrest Handle Weldment	1
26	028-0317-0X	Headrest Upholstery-Standard (Shown) {Specify Color}	1
	002-0403-0X	Headrest Upholstery-6" Round (Not Shown) {Specify Color}	1
	002-0404-0X	Headrest Upholstery-V Shaped (Not Shown) {Specify Color}	1

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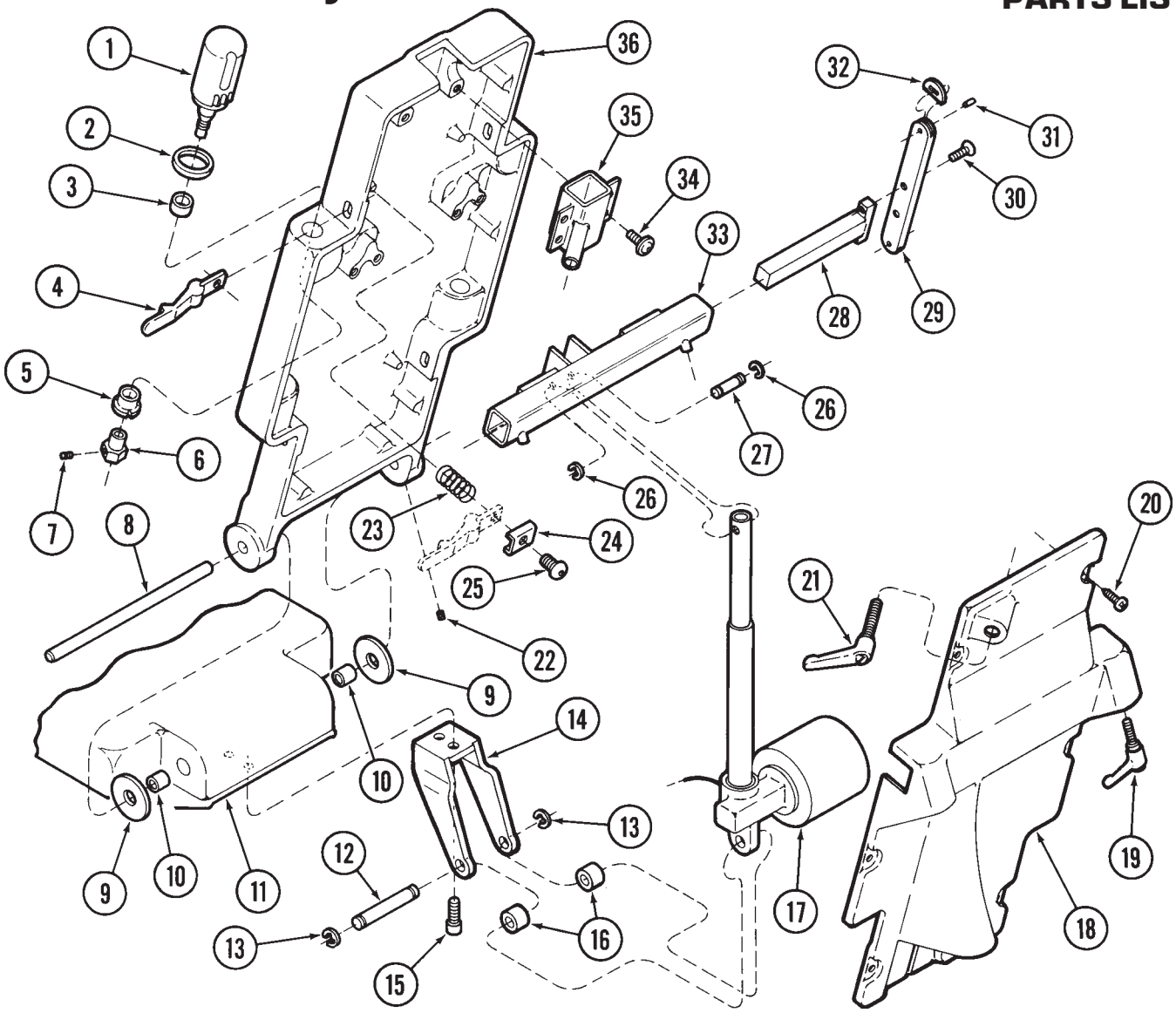
Back Assembly



MA2098

Item	Part No.	Description	Qty.
1	057-0329-00	L.H. Ratchet Knob (Shown)	2
	057-0328-00	R.H. Ratchet Knob (Opposite)	2
2	053-0469-00	Ratchet Seal	4
3	016-0076-13	Bushing	4
4	020-0125-00	Latch Casting	4
5	016-0392-04	Flanged Bushing	4
6	051-0703-00	Ratchet Nut	4
7	040-0010-14	Set Screw	4
8	057-0330-00	Back Shaft	1
9	053-0470-00	Pivot Seal	2
10	016-0076-09	Bearing	2
11		Seat Assembly (See Breakdown Elsewhere)	Ref
12	042-0048-09	Clevis Pin	1
13	042-0007-09	E-Ring	2
14	030-0792-10	Back Clevis Weldment	1
15	040-0312-29	Screw	2
16	053-0407-01	Plastic Spacer	2
17		Back Actuator Assembly (See Breakdown Elsewhere)	Ref
18	053-0426-00	Back Cover	1
19	016-0126-03	Handle	2
20	040-0010-47	Screw	8
21	016-0126-05	Handle	1
22	040-0250-60	Set Screw	1
23	025-0042-03	Spring	4
24	050-2147-10	Ratchet Stop	4
25	040-0375-46	Screw	4
26	042-0007-08	E-Ring	2
27	042-0006-05	Clevis Pin	1
28	030-0794-00	Back Inner Bar Weldment	2
29	051-0699-00	Back Accessory Rail	2
30	040-0375-45	Screw	4
31	042-0002-26	Roll Pin	4
32	050-2317-00	Side Rail End Stop	4
33	030-0793-00	Outer Tube Weldment	1
34	042-0109-00	Screw	8
35	030-0790-00	Female Tube Weldment	1
36	020-0120-10	Back Casting	1

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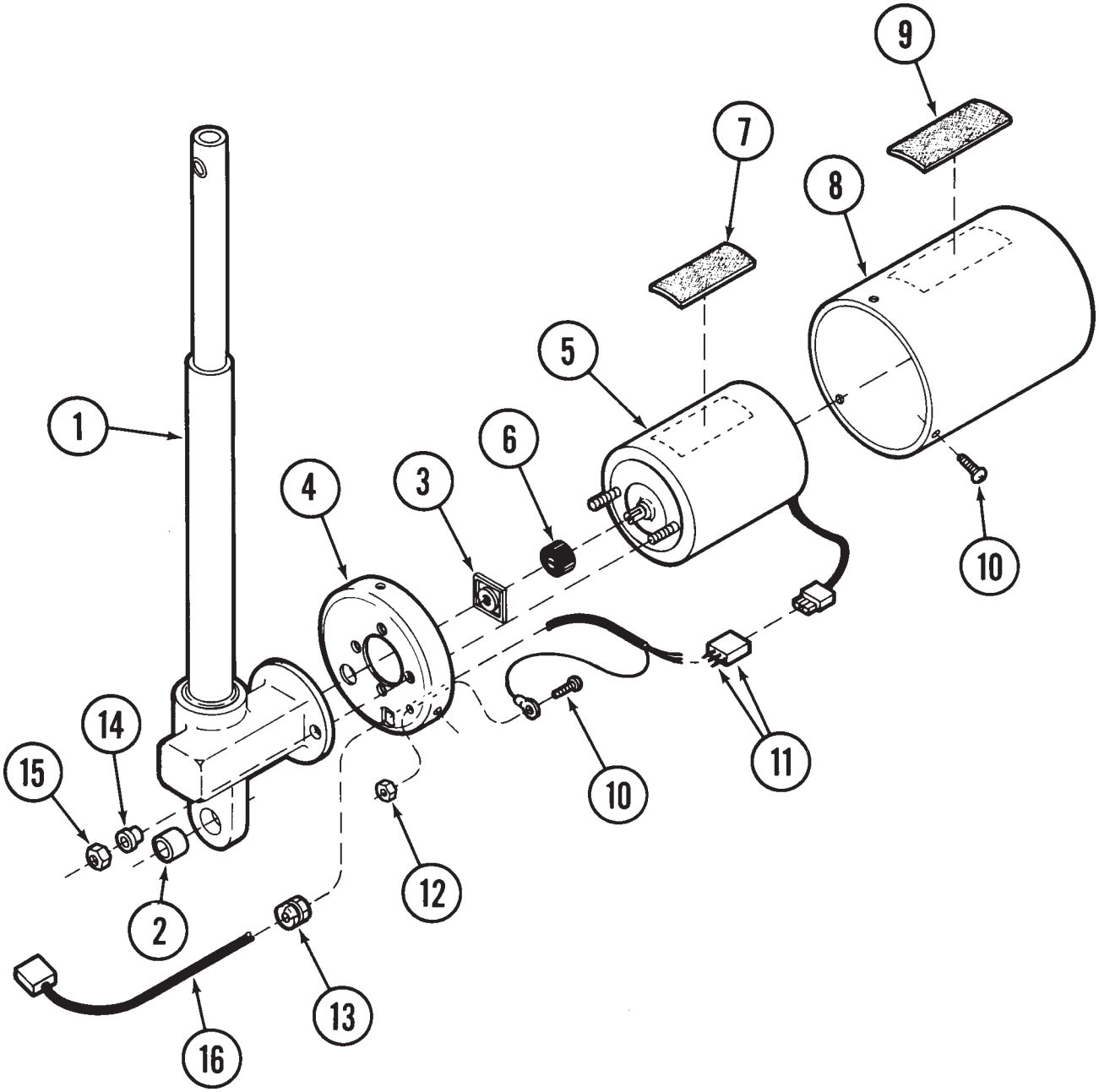
Back Actuator Assembly



MA2114

Item	Part No.	Description	Qty.
	002-0383-00	Back Actuator Assembly (Includes Items 1 thru 16)	1
1	• 002-0383-01	• Actuator Mechanism (Includes Item 2 and 3)	1
2	• •	• • Bushing	1
3	• • 016-0237-00	• • Actuator Brake	1
4	• 050-2002-00	• Motor Cover Mount	1
5	• 002-0383-02	• Motor Assembly (Includes Items 6 and 7)	1
6	• • 016-0509-00	• • Motor Coupler	1
7	• • 061-0135-00	• • Caution Label	1
8	• 050-2003-00	• Motor Cover	1
9	• 061-0033-00	• Caution Label-(Shock)	1
10	• 040-0010-47	• Screw	4
11	• 015-0591-02	• 3 Circuit Cap	1
	• 015-0396-00	• Amp Socket	3
12	• 041-0010-00	• Nut	1
13	• 015-0002-06	• Strain Relief Bushing	1
14	• 053-0198-00	• Shoulder Washer	2
15	•	• Nut	2
16	• 015-0761-00	• Back Harness	1

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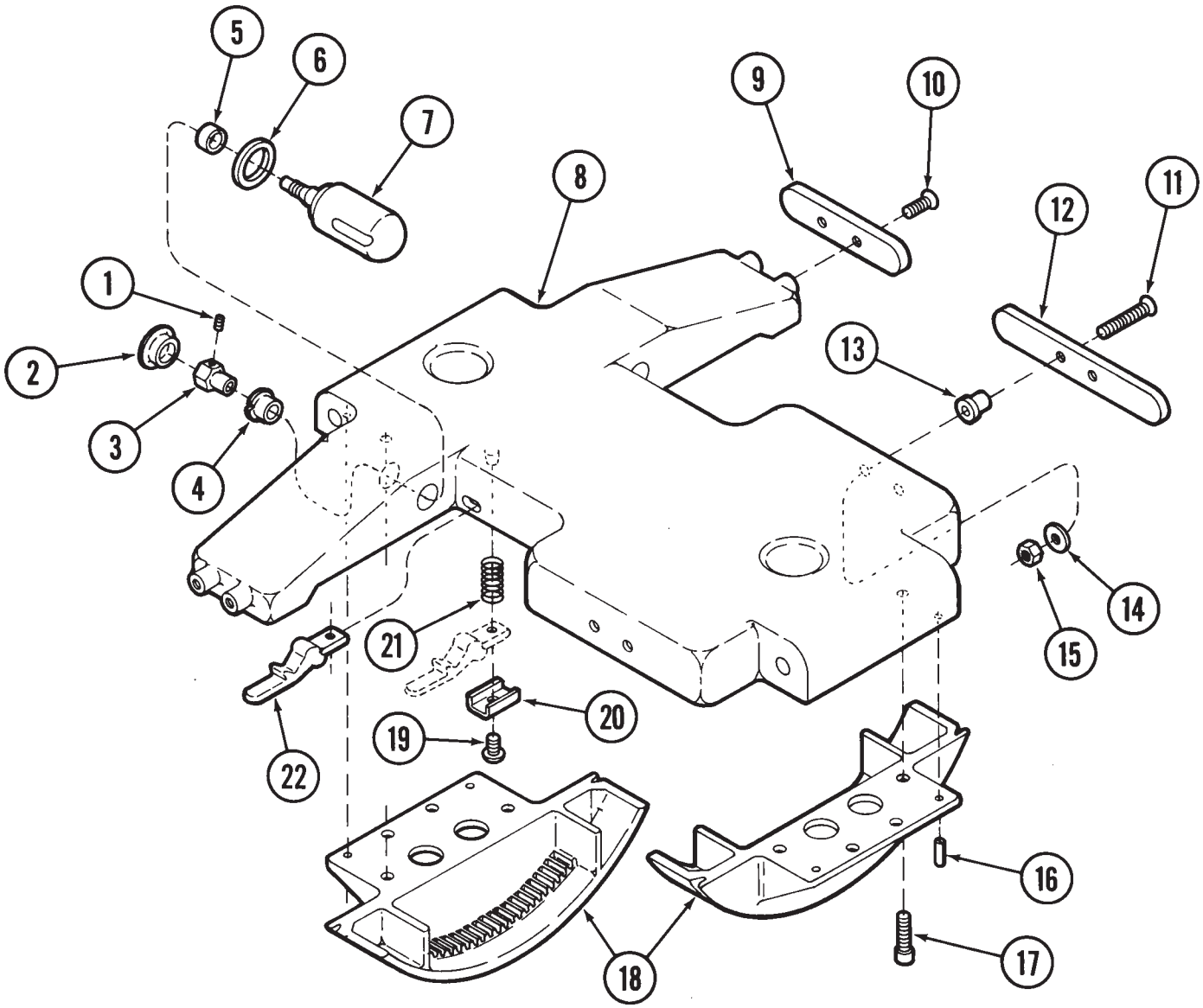
Seat Assembly



MA2100

Item	Part No.	Description	Qty.
1	040-0010-14	Set Screw	2
2	053-0050-02	Hole Plug	2
3	051-0703-00	Ratchet Nut	2
4	016-392-04	Flanged Bushing	2
5	016-0076-13	Bushing	2
6	053-0469-00	Ratchet Seal	2
7	057-0329-00	L.H. Ratchet Knob (Shown)	1
	057-0328-00	R.H. Ratchet Knob (Opposite)	1
8	020-0119-10	Seat Casting	1
9	051-0704-00	Outer Seat Accessory Rail	2
10	040-0375-45	Screw	4
11	040-0375-44	Screw	4
12	051-0700-00	Inner Seat Accessory Rail	2
13	057-0324-00	Standoff	4
14	045-0001-01	Washer	4
15	041-0375-10	Nut	4
16	042-0001-03	Roll Pin	4
17	040-0375-47	Screw	4
18	020-0122-10	Tilt Block Casting	2
19	040-0375-46	Screw	2
20	050-2147-10	Ratchet Stop	2
21	025-0042-03	Spring	2
22	020-0125-00	Latch Casting	2

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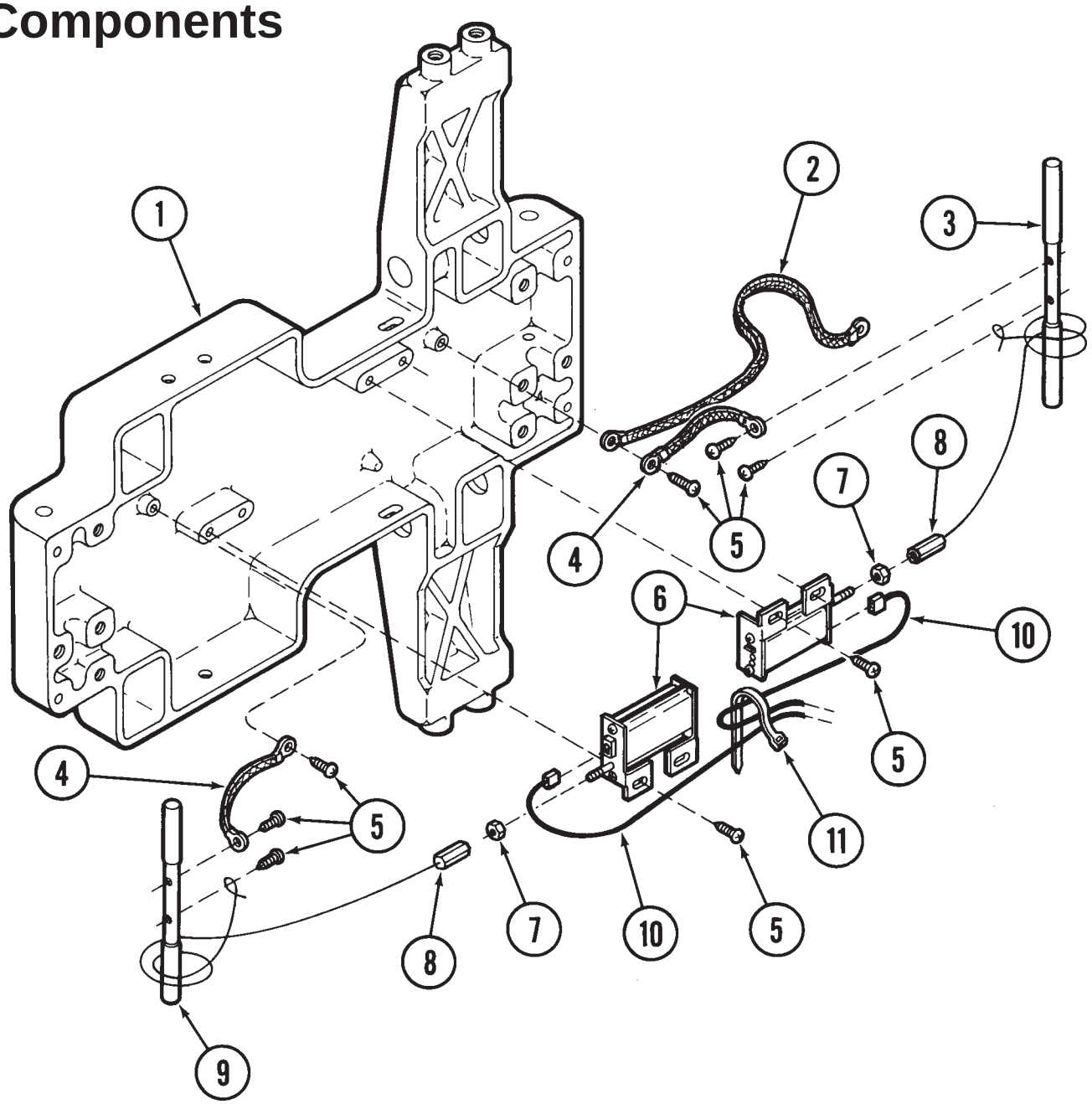
Seat Transducer Components



MA2101

Used on units with Serial Number DN1000 thru DN1031

Item	Part No.	Description	Qty.
1		Seat Casting (Refer to Seat Assembly Breakdown)	Ref
2	015-0082-01	Grounding Braid	1
3	057-0331-00	Foot Shaft	1
4	015-0082-02	Grounding Braid	2
5	040-0010-47	Screw	10
6	015-0715-00	Linear Transducer	2
7	041-0008-00	Nut	2
8	029-1512-01	Cable / Turnbuckle Assembly	2
9	057-0330-00	Back Shaft	1
10		Transducer Harness (Refer to Wiring Diagram Elsewhere)	Ref
11	015-0013-02	Cable Tie	2

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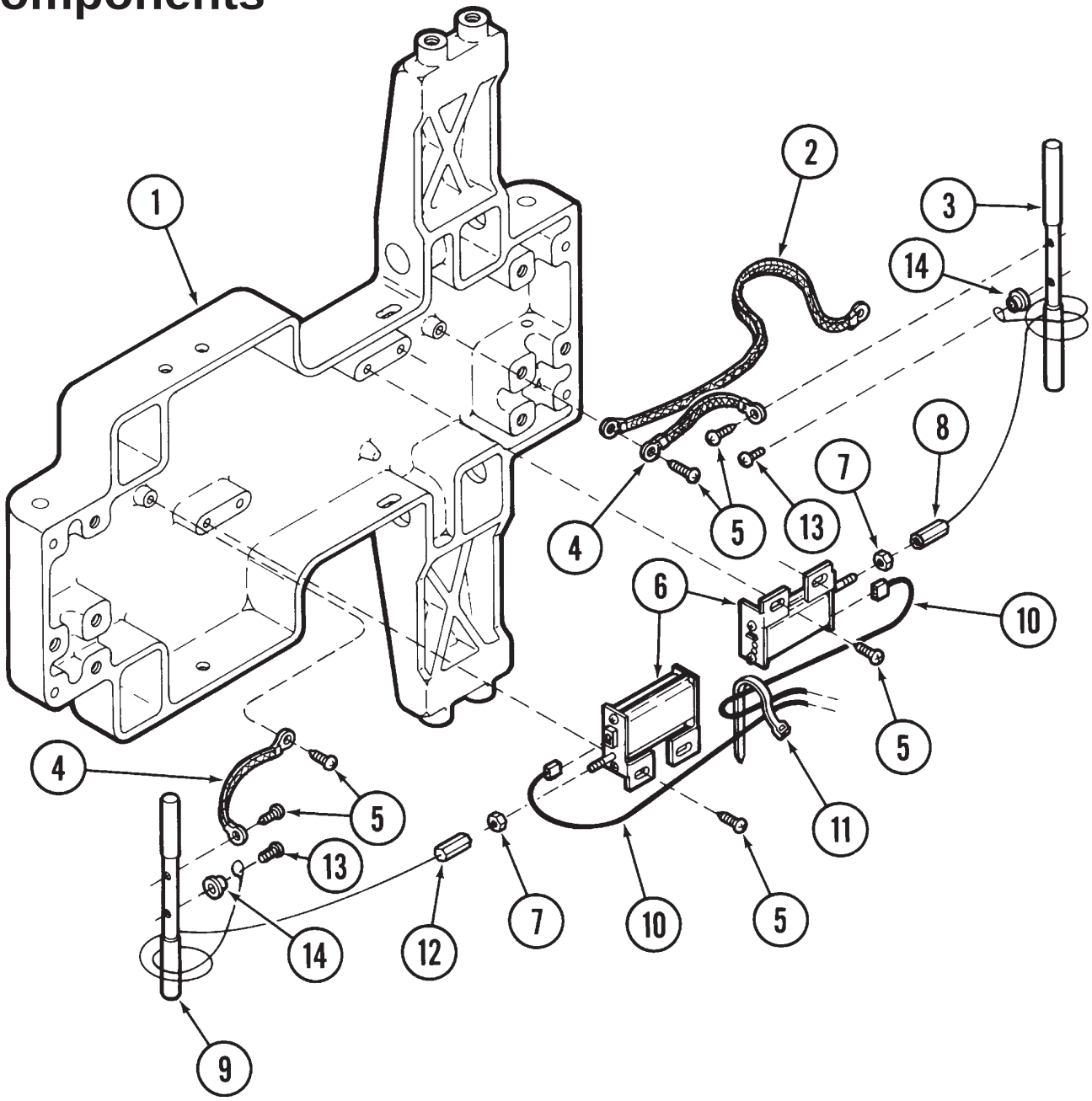
Seat Transducer Components



MA2101

Used on units with Serial Number DN1032 thru Present

Item	Part No.	Description	Qty.
1		Seat Casting (Refer to Seat Assembly Breakdown)	Ref
2	015-0082-01	Grounding Braid	1
3	057-0331-00	Foot Shaft	1
4	015-0082-02	Grounding Braid	2
5	040-0010-47	Screw	8
6	015-0715-00	Linear Transducer	2
7	041-0008-00	Nut	2
8	029-1590-01	Foot Cable / Turnbuckle Assembly	1
9	057-0330-00	Back Shaft	1
10		Transducer Harness (Refer to Wiring Diagram Elsewhere)	Ref
11	015-0013-02	Cable Tie	2
12	029-1590-00	Back Cable / Turnbuckle Assembly	1
13	040-0010-46	Screw	2
14	053-0198-00	Shoulder Washer	2

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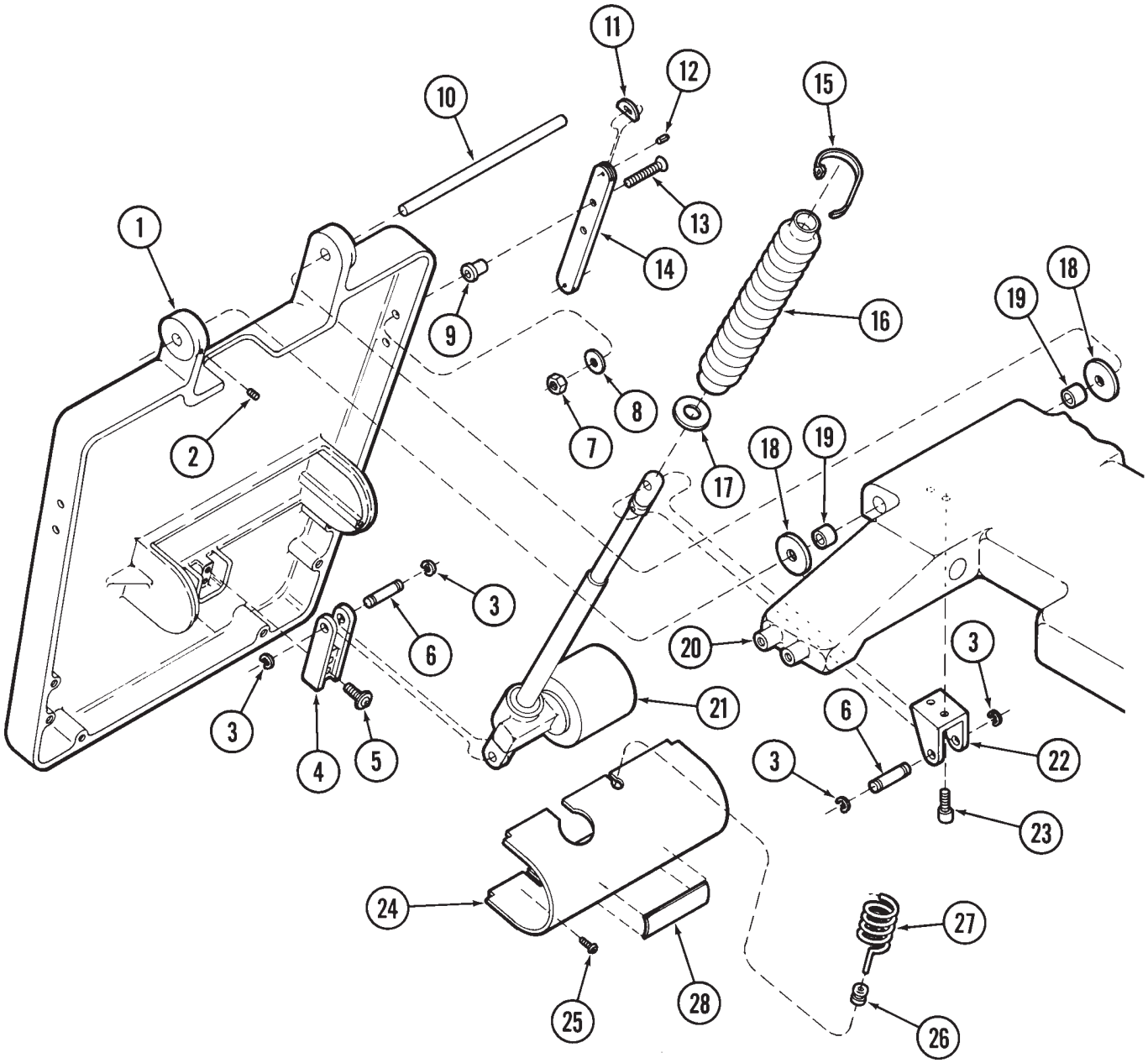
Foot Assembly



MA2099

Item	Part No.	Description	Qty.
1	020-0121-10	Foot Casting	1
2	040-0250-60	Set Screw	1
3	042-0007-08	E-Ring	4
4	030-0795-10	Foot Clevis Mount Weldment	1
5	042-0109-00	Screw	2
6	042-0006-06	Clevis Pin	2
7	041-0375-10	Nut	4
8	045-0001-01	Washer	4
9	057-0324-00	Standoff	4
10	057-0331-00	Foot Shaft	1
11	050-2317-00	Side Rail End Stop	4
12	042-0001-26	Roll Pin	4
13	040-0375-44	Screw	4
14	051-0699-00	Foot Accessory Rail	2
15	015-0013-04	Cable Tie	1
16	053-0439-00	Foot Bellows	1
17	016-0195-01	Thrust Washer	1
18	053-0470-00	Pivot Seal	2
19	016-0076-09	Bearing	2
20		Seat Assembly (See Breakdown Elsewhere)	Ref
21		Foot Actuator Assembly (See Breakdown Elsewhere)	Ref
22	030-0791-10	Foot Clevis Weldment	1
23	040-0312-29	Screw	2
24	050-2148-10	Foot Actuator Cover	1
25	040-0010-47	Screw	2
26	015-0777-00	Straight Thru Fitting	1
27		Foot Harness (Refer to Wiring Diagram Elsewhere)	Ref
28	061-0033-00	Caution Label-(Shock)	1

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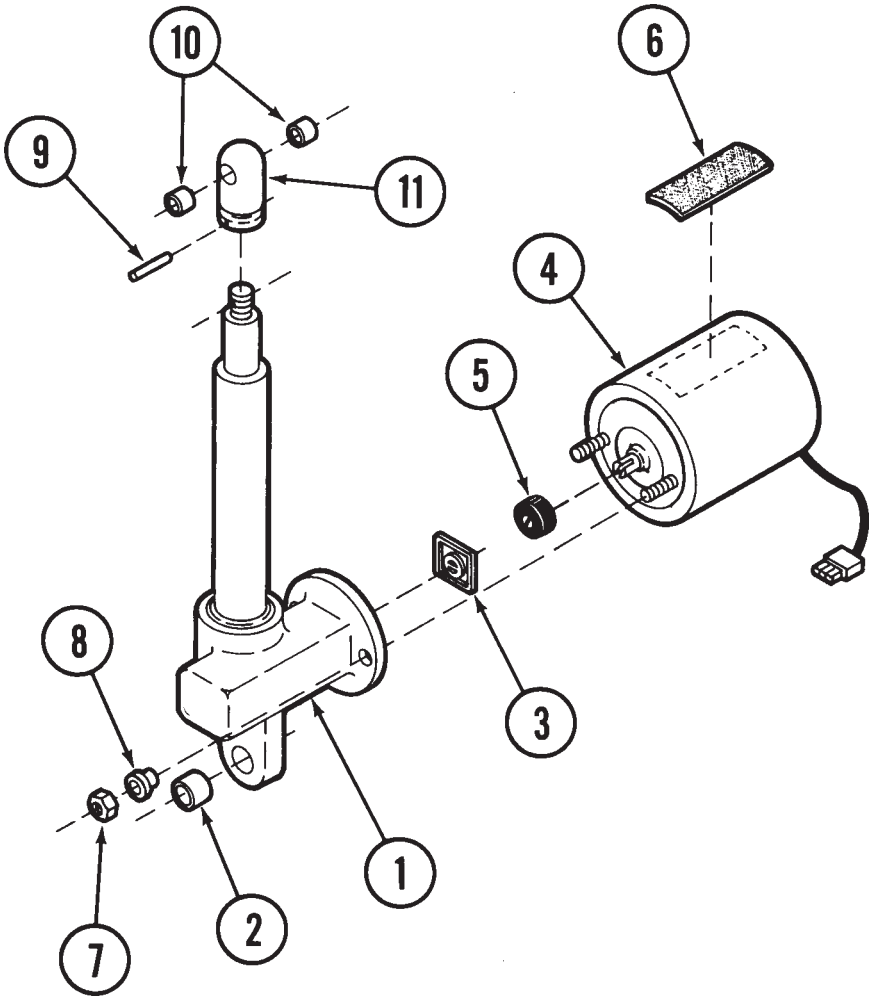
Foot Actuator Assembly



MA2115

Item	Part No.	Description	Qty.
	002-0385-00	Foot Actuator Assembly (Includes Items 1 thru 11)	1
1	• 002-0385-01	• Actuator Mechanism (Includes Item 2 , 3 , 9 , 10 and 11)	1
2	• •	• • Bushing	1
3	• • 016-0237-00	• • Actuator Brake	1
4	• 002-0385-02	• Motor Assembly (Includes Items 5 and 6)	1
5	• • 016-0509-00	• • Motor Coupler	1
6	• • 061-0135-00	• • Caution Label	1
7	•	• Nut	2
8	• 053-0198-00	• Shoulder Washer	2
9	• 042-0001-07	• Roll Pin	1
10	• 016-0076-04	• DU Bearing	2
11	• 057-0336-10	• Actuator Pivot Knob	1

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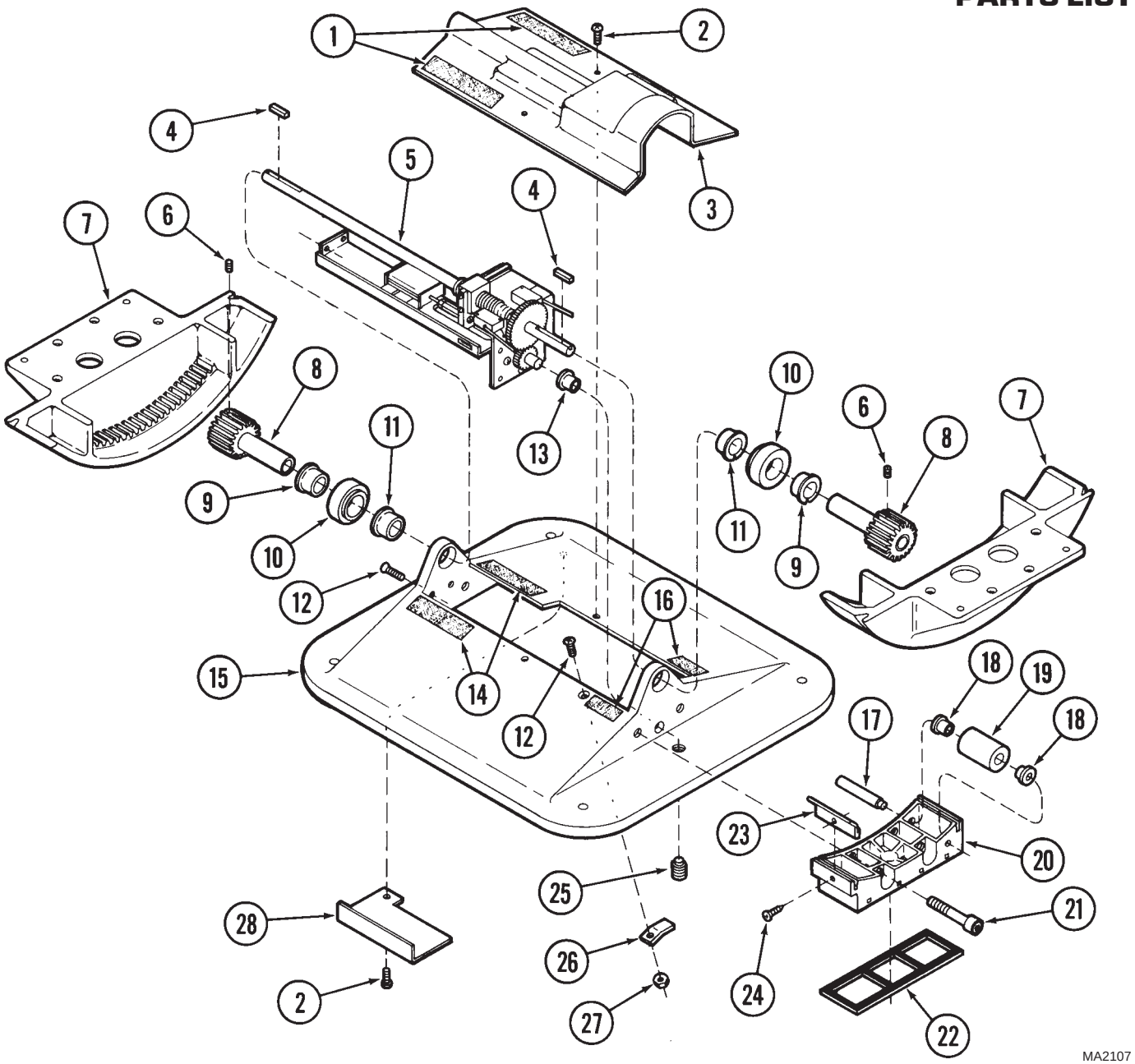
Lateral Tilt Mechanism



Item	Part No.	Description	Qty.
1	061-0033-00	Caution Label-(Shock)	2
2	040-0010-47	Screw	3
3	053-0471-00	Lateral Tilt Cover	1
4	042-0008-02	Key	2
5		Lateral Tilt Drive Components (See Breakdown Elsewhere)	Ref
6	040-0010-02	Set Screw	2
7		Tilt Block (Refer to Seat Assembly Breakdown)	Ref
8	016-0470-00	Polyurethane Pinion Gear	2
9	016-0392-05	Bearing	2
10	016-0469-00	Gear Roller	2
11	016-0392-02	Bearing	2
12	040-0010-95	Screw	3
13	016-0392-00	Bearing	1
14	061-0135-00	Caution Label	2
15		Trend. Plate Weldment (Refer to Trendelenburg Components Breakdown)	Ref
16	061-0045-00	Caution Label-(Covers)	2
17	057-0343-00	Roller Axle	4
18	016-0131-01	Bearing	8
19	016-0471-00	Roller	4
20	020-0123-10	Wheel Housing	2
21	040-0375-48	Screw	4
22	054-0171-00	Wheel Housing Seal	2
23	053-0431-00	Scraper Seal	4
24	040-0006-54	Screw	4
25	040-0750-00	Set Screw	2
26	050-2339-10	Tab	1
27	041-0010-00	Nut	1
28	050-2281-10	Cover Angle	1

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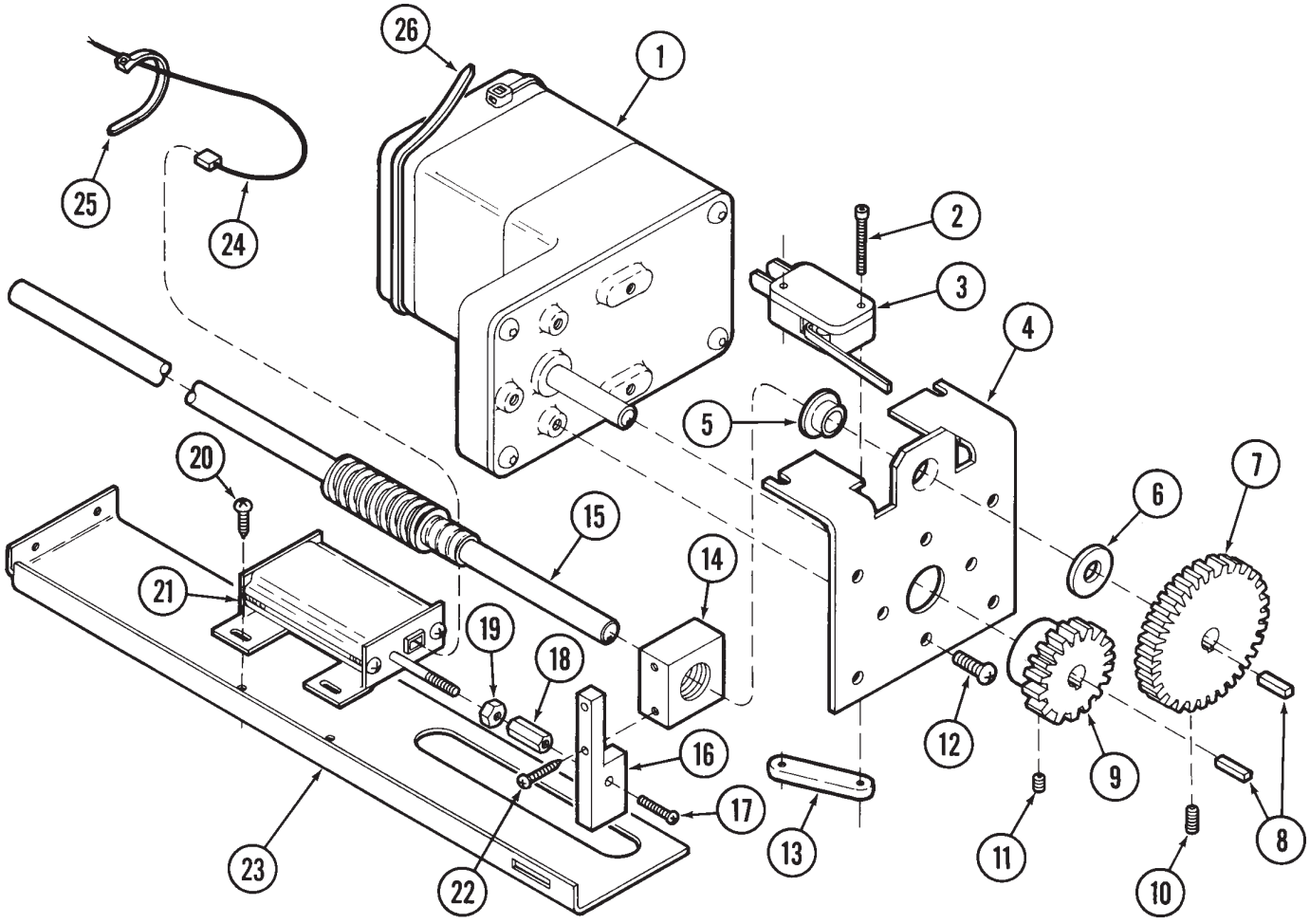
Lateral Tilt Drive Components



MA2106

Item	Part No.	Description	Qty.
1	002-0386-00	Lateral Tilt Motor Assembly	1
2	040-0004-13	Screw	4
3	015-0754-00	Limit Switch	2
4	050-2206-10	Bull Gear Bracket	1
5	016-0392-00	Bearing	1
6	K902583-1	Fiber Washer	1
7	016-0468-00	Bull Gear	1
8	042-0008-02	Key	2
9	016-0467-00	Pinion Gear	1
10	040-0010-02	Set Screw	1
11	040-0010-14	Set Screw	1
12	040-0008-52	Screw	5
13	050-2208-00	Clamp Plate	2
14	053-0475-00	Lead Nut	1
15	030-0806-01	Drive Shaft	1
16	051-0712-00	Nut Guide	1
17	040-0008-08	Screw	1
18	016-0487-00	Threaded Spacer	1
19	041-0008-00	Nut	1
20	040-0010-47	Screw	2
21	015-0715-00	Linear Transducer	1
22	040-0006-26	Screw	2
23	050-2338-10	Transducer Plate	1
24		Transducer Harness (Refer to Wiring Diagram Elsewhere)	Ref
25	015-0013-02	Cable Tie (Small)	1
26	015-0013-01	Cable Tie (Large)	1

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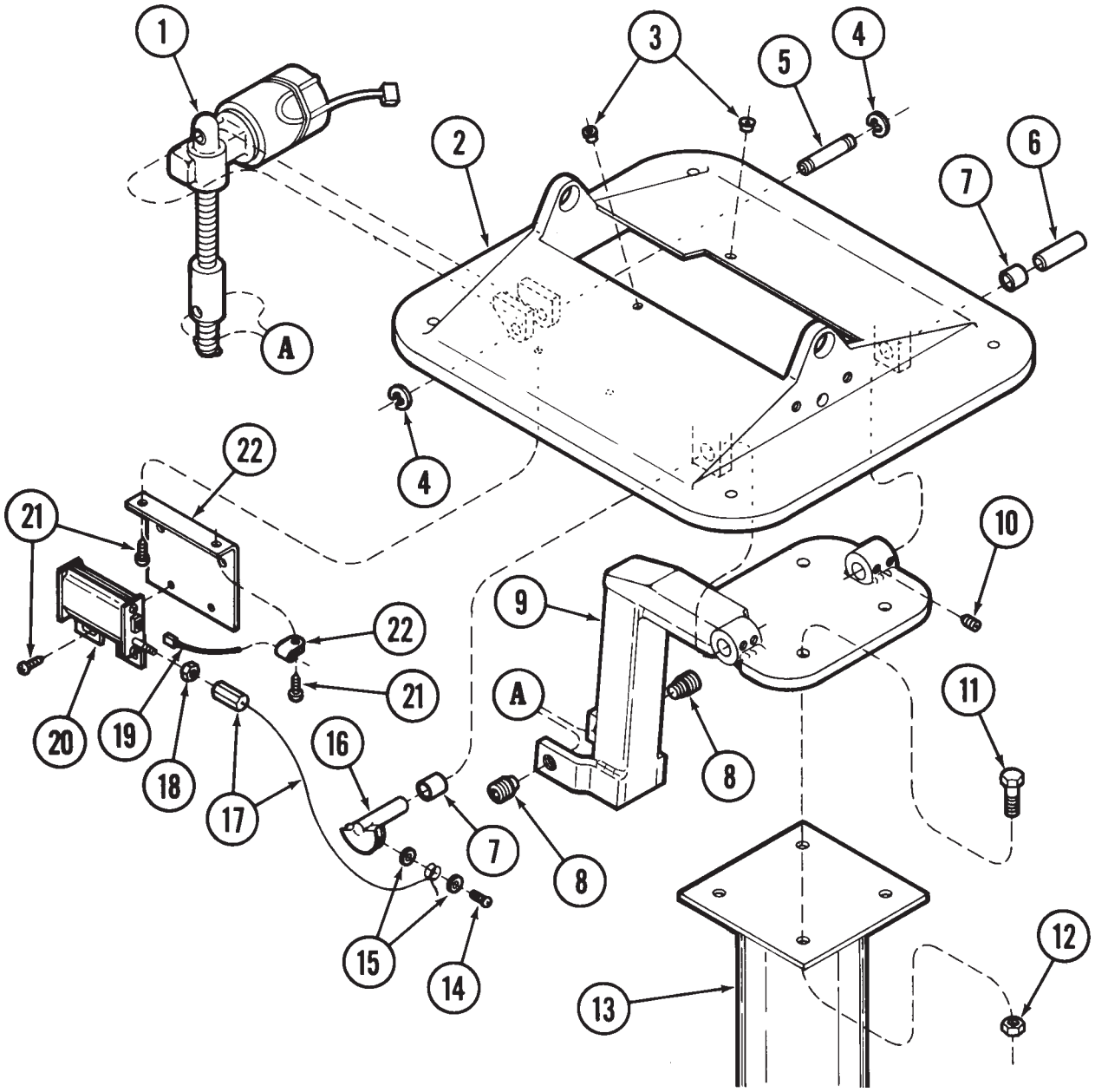
Trendelenburg Components



MA2105

Used on units with Serial Number DN1000 thru DN1012

Item	Part No.	Description	Qty.
1		Trendelenburg Actuator Assembly (See Breakdown Elsewhere)	Ref
2	030-0802-10	Trendelenburg Plate Weldment	1
3	042-0045-01	Nutsert	2
4	042-0007-09	E-Ring	2
5	042-0048-02	Clevis Pin	1
6	057-0340-00	Pivot Shaft	1
7	016-0076-09	Bearing	2
8	042-0080-00	Pivot Screw	2
	042-0025-00	Loctite Adhesive	AR
9	030-0803-10	Column Adapter	1
10	040-0250-04	Set Screw	4
11	040-0375-02	Screw	4
12	041-0375-10	Nut	4
13		Column Assembly (See Breakdown Elsewhere)	Ref
14	040-0006-12	Screw	1
15	045-0001-50	Washer	2
16	030-0804-00	Pivot Shaft Weldment	1
17	029-1512-00	Cable / Turnbuckle Assembly	1
18	041-0008-00	Nut	1
19		Transducer Harness (Refer to Wiring Diagram Elsewhere)	Ref
20	015-0715-00	Linear Transducer	1
21	040-0010-47	Screw	4
22	050-2282-10	Transducer Mounting Plate	1

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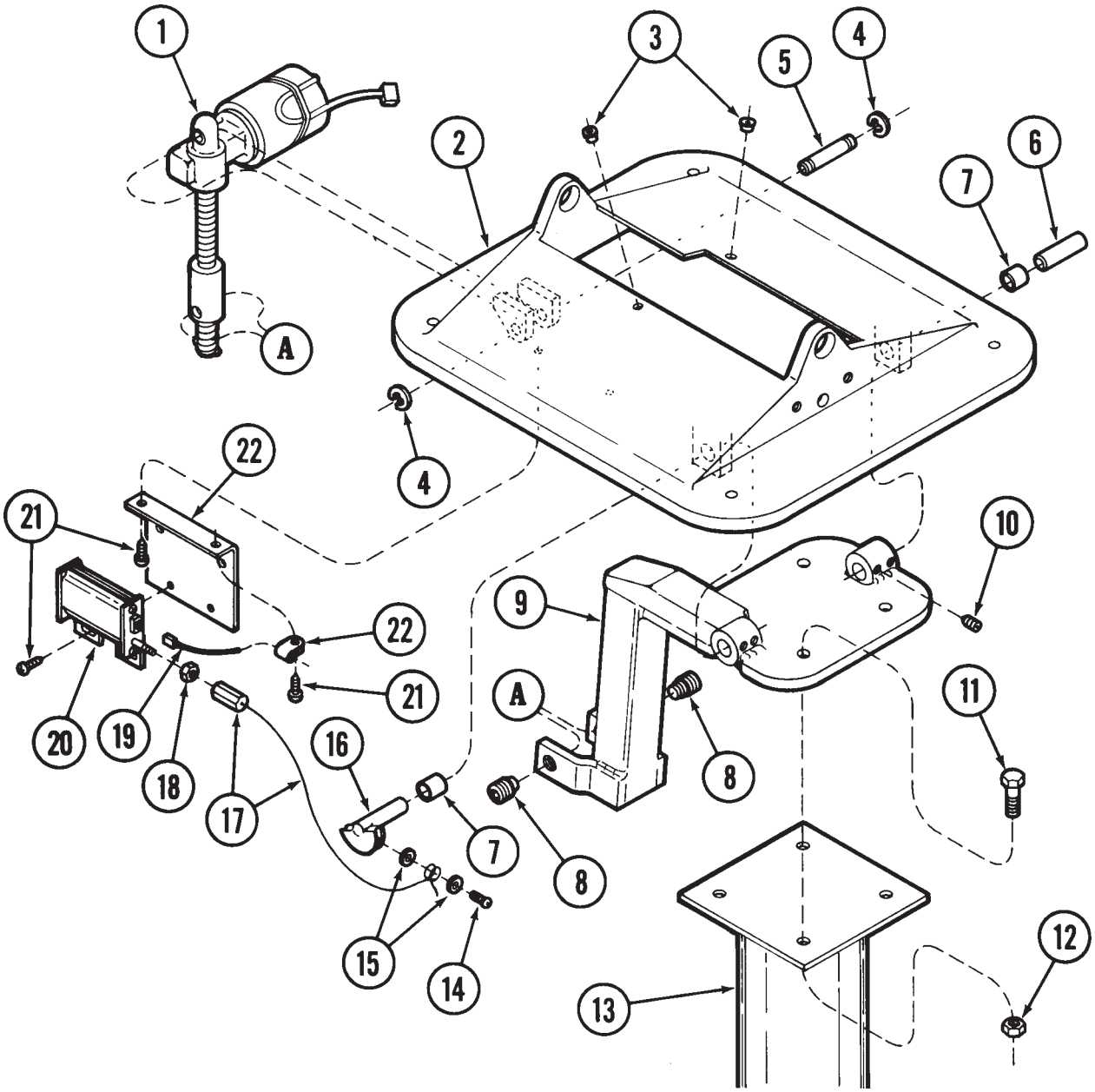
Trendelenburg Components



MA2105

Used on units with Serial Number DN1013 thru Present

Item	Part No.	Description	Qty.
1		Trendelenburg Actuator Assembly (See Breakdown Elsewhere)	Ref
2	030-0835-10	Trendelenburg Plate Weldment	1
3	042-0045-01	Nutsert	2
4	042-0007-09	E-Ring	2
5	042-0048-02	Clevis Pin	1
6	057-0356-00	Pivot Shaft	1
7	016-0076-09	Bearing	2
8	042-0080-00	Pivot Screw	2
	042-0025-00	Loctite Adhesive	AR
9	030-0834-10	Column Adapter	1
10	040-0250-04	Set Screw	4
11	040-0375-02	Screw	4
12	041-0375-10	Nut	4
13		Column Assembly (See Breakdown Elsewhere)	Ref
14	040-0006-12	Screw	1
15	045-0001-50	Washer	2
16	030-0804-00	Pivot Shaft Weldment	1
17	029-1512-00	Cable / Turnbuckle Assembly	1
18	041-0008-00	Nut	1
19		Transducer Harness (Refer to Wiring Diagram Elsewhere)	Ref
20	015-0715-00	Linear Transducer	1
21	040-0010-47	Screw	4
22	050-2282-10	Transducer Mounting Plate	1

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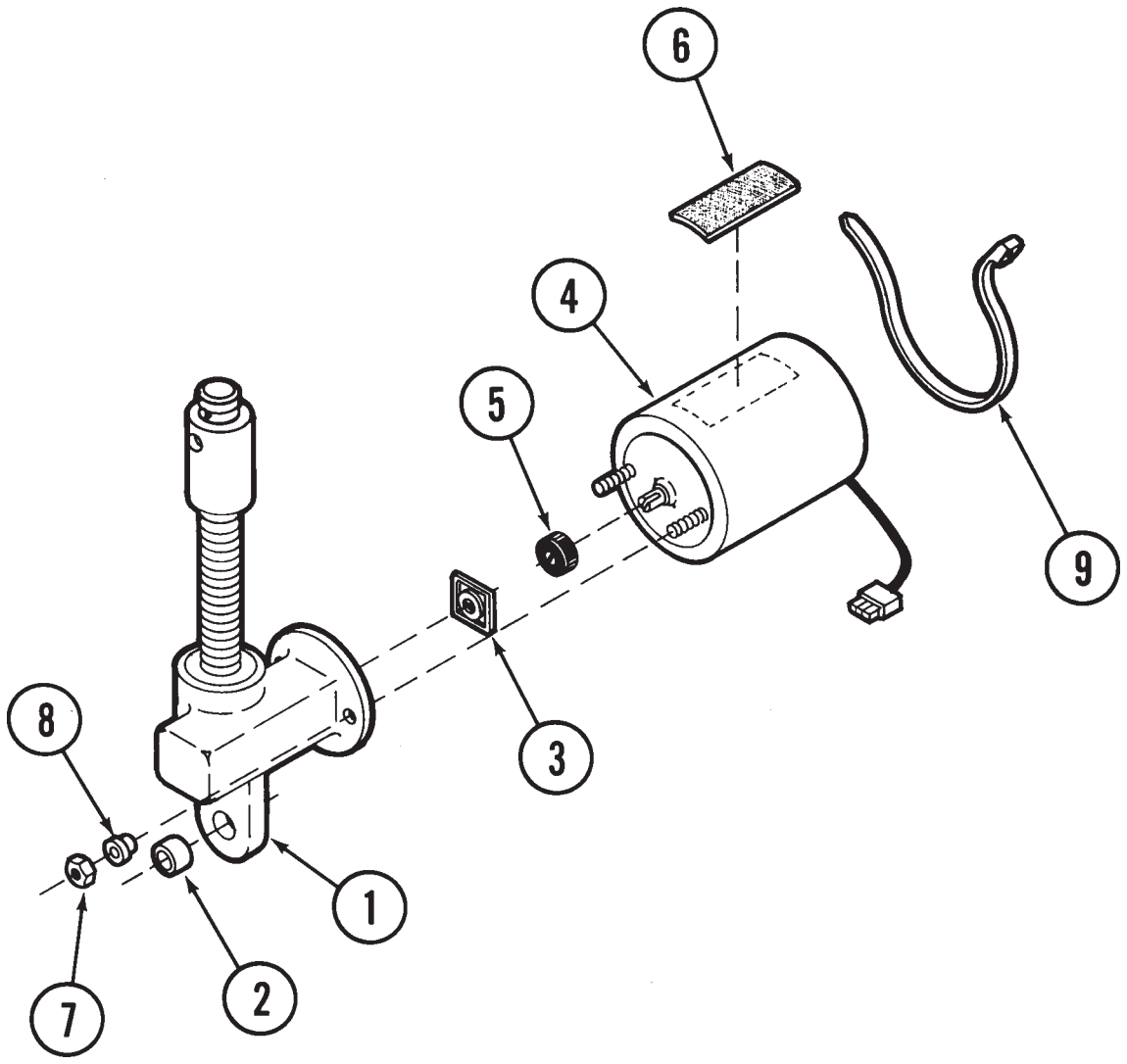
Trendelenburg Actuator Assembly



MA2117

Item	Part No.	Description	Qty.
	002-0384-00	Trendelenburg Actuator Assembly (Includes Items 1 thru 9)	1
1	• 002-0384-01	•Actuator Mechanism (Includes Item 2 and 3)	1
2	• •	• • Bushing	1
3	• • 016-0237-00	• • Actuator Brake	1
4	• 002-0384-02	• Motor Assembly (Includes Items 5 and 6)	1
5	• • 016-0509-00	• • Motor Coupler	1
6	• • 061-0135-00	• • Caution Label	1
7	•	• Nut	2
8	• 053-0198-00	• Shoulder Washer	2
9	• 015-0013-01	• Cable Tie	1

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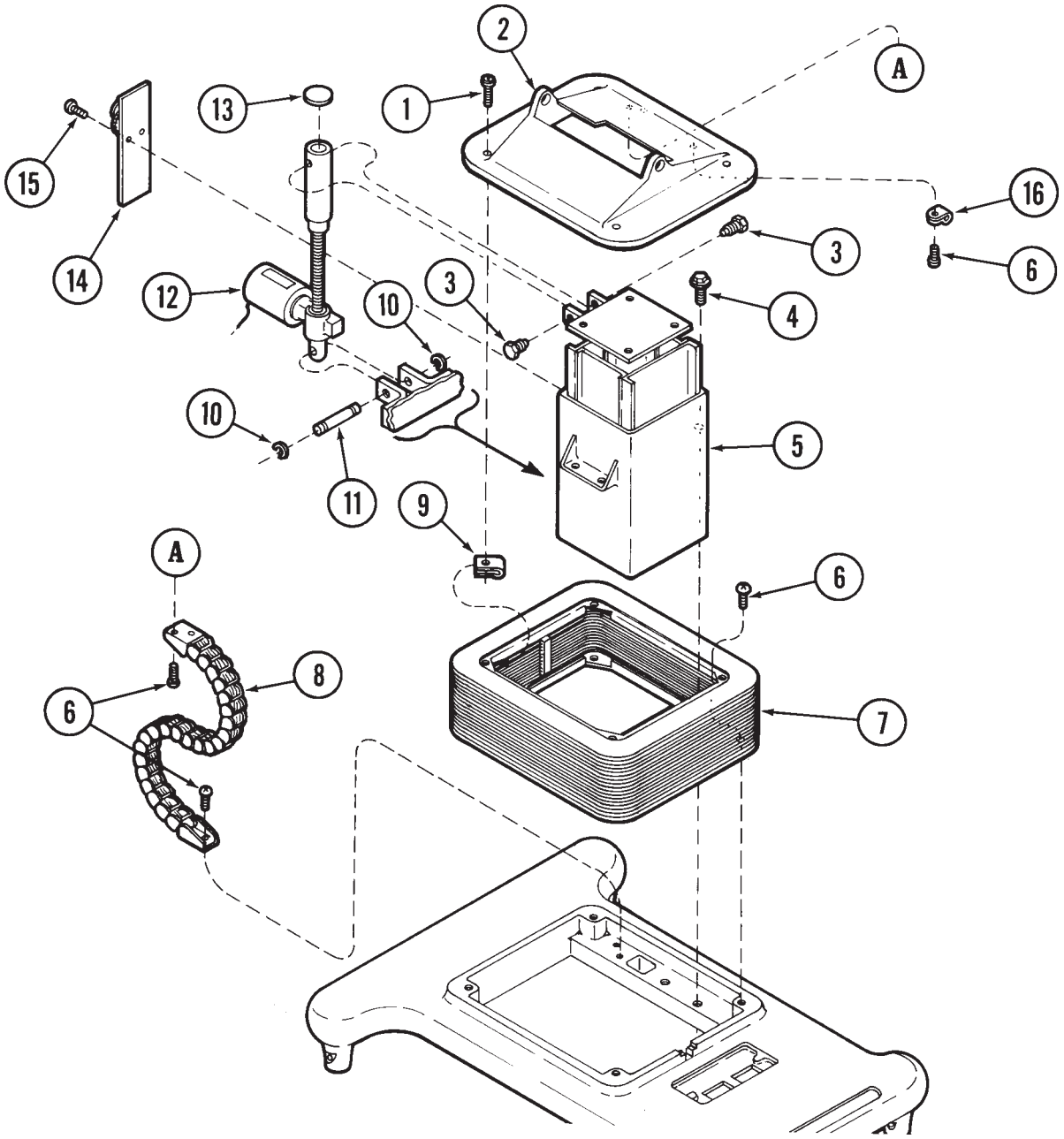
Column Components



MA2108

Used on units with Serial Number DN1000 thru DN1012

Item	Part No.	Description	Qty.
1	042-0059-00	Joint Connector Bolt	4
2		Trend. Plate Weldment (Refer to Trendelenburg Components Breakdown)	Ref
3	051-0713-00	Pivot Screw	2
	042-0025-00	Loctite Adhesive	AR
4	040-0375-00	Screw	4
5		Column Assembly (See Breakdown Elsewhere)	Ref
6	040-0010-47	Screw	16
7	029-1449-00	Bellows Assembly	1
8		E-Chain Assembly (Contact Factory {Ref. ECO No. M6907)	1
9	041-0031-00	U-Nut	4
10	042-0007-09	E-Ring	2
11	042-0048-09	Clevis Pin	1
12		Base Actuator Assembly (See Breakdown Elsewhere)	Ref
13	053-0131-28	Velcro Cap	1
14		Base Reducer Assembly (See Breakdown Elsewhere)	Ref
15	040-0312-22	Screw	2
16	015-0371-00	Cable Clamp-5/16" Dia.	1
	015-0371-01	Cable Clamp-1/4" Dia.	4
	015-0371-02	Cable Clamp-1/8" Dia.	2

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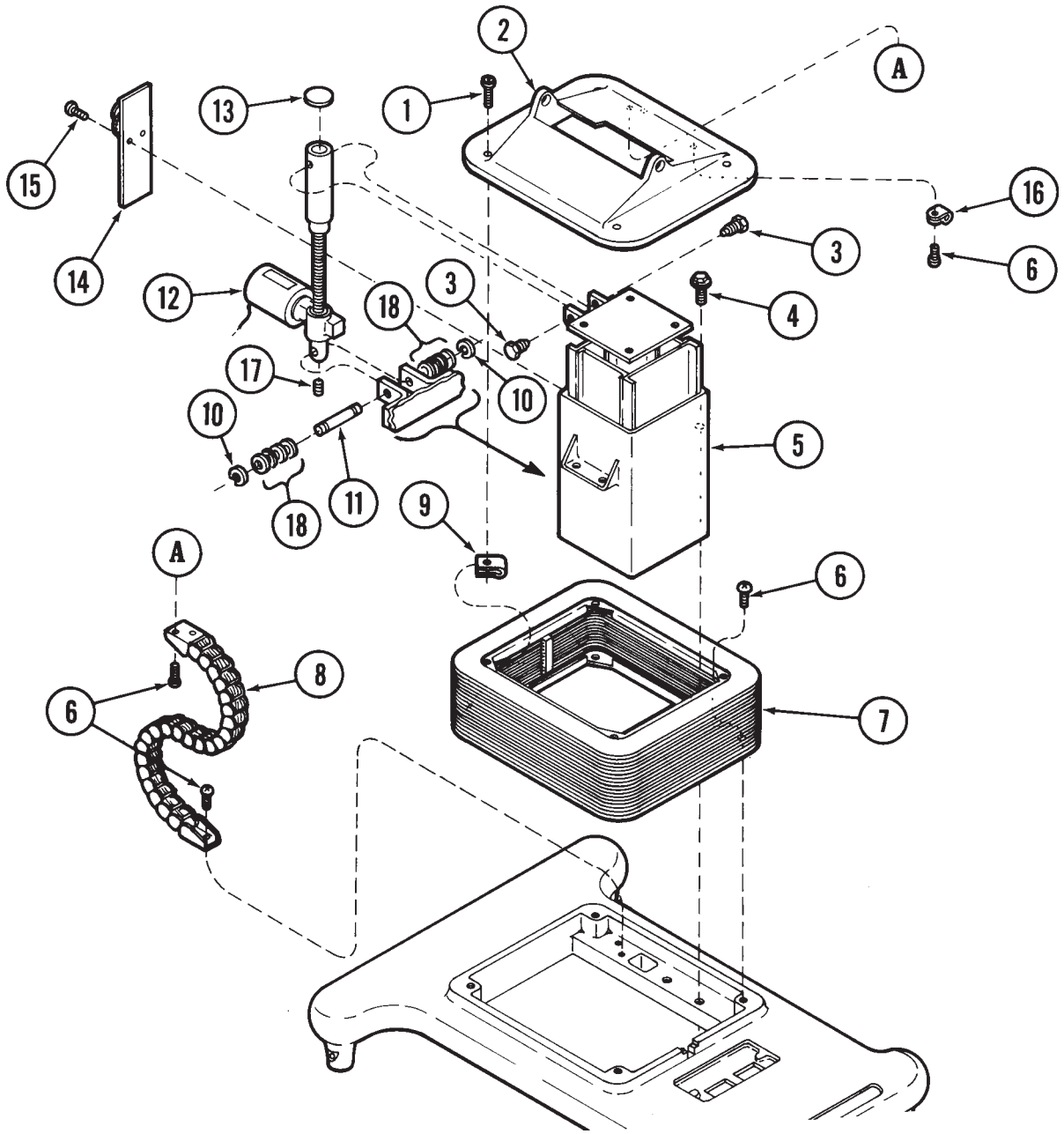
Column Components



MA2108

Used on units with Serial Number DN1013 thru Present

Item	Part No.	Description	Qty.
1	042-0059-00	Joint Connector Bolt	4
2		Trend. Plate Weldment (Refer to Trend-elenburg Components Breakdown)	Ref
3	051-0713-00	Pivot Screw	2
	042-0025-00	Loctite Adhesive	AR
4	040-0375-00	Screw	4
5		Column Assembly (See Breakdown Elsewhere)	Ref
6	040-0010-47	Screw	16
7	029-1449-00	Bellows Assembly	1
8	002-0389-00	Cable Carrier Kit (Includes Wiring Harness)	1
9	041-0031-00	U-Nut	4
10	042-0007-09	E-Ring	2
11	042-0048-09	Clevis Pin	1
12		Base Actuator Assembly (See Breakdown Elsewhere)	Ref
13	053-0131-28	Velcro Cap	1
14		Base Reducer Assembly (See Breakdown Elsewhere)	Ref
15	040-0312-22	Screw	2
16	015-0371-00	Cable Clamp-5/16" Dia.	1
	015-0371-01	Cable Clamp-1/4" Dia.	4
	015-0371-02	Cable Clamp-1/8" Dia.	2
17	040-0250-04	Set Screw	1
18	045-0001-51	Shim Washer	8

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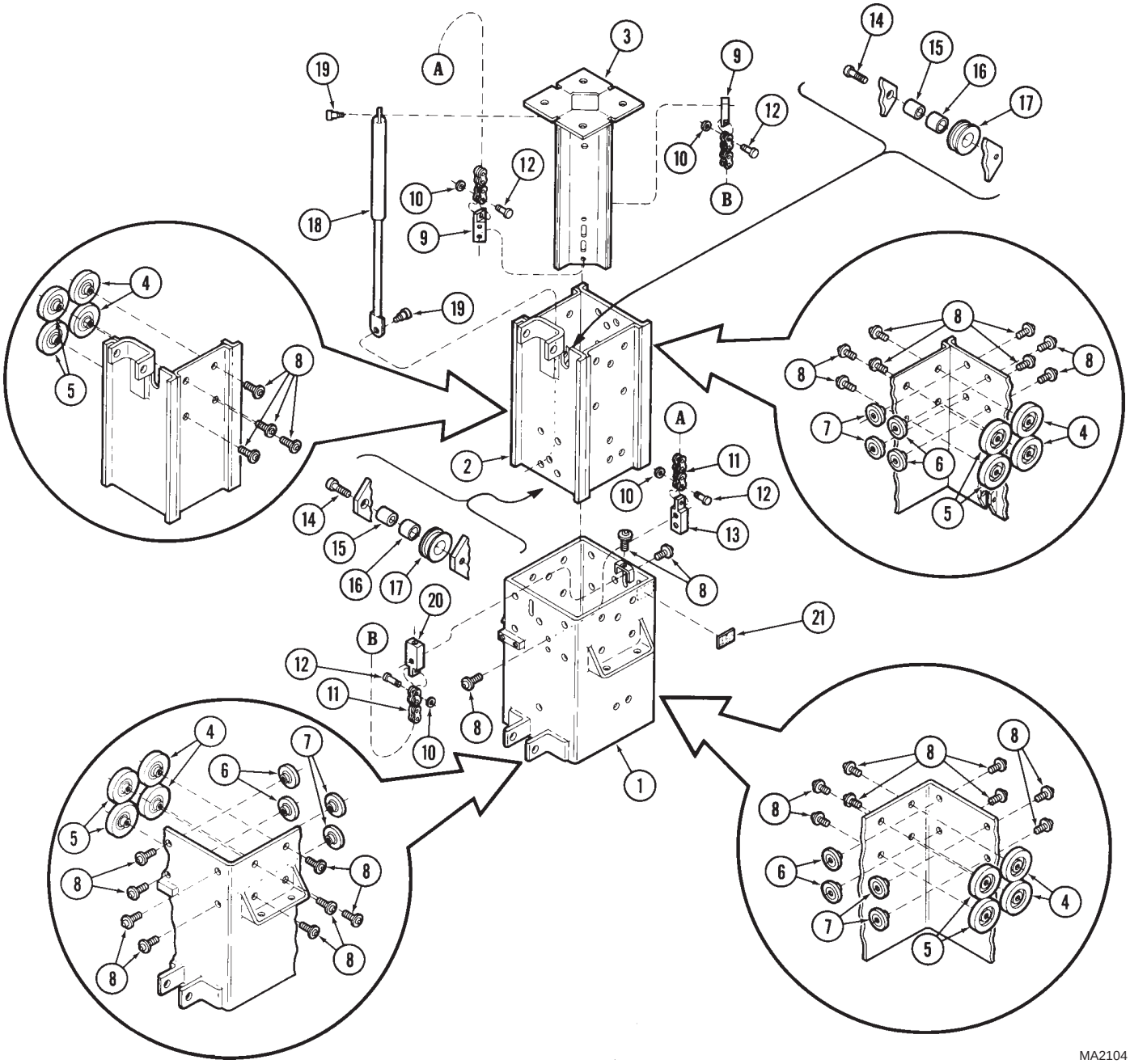
Column Assembly



Used on units with Serial Number DN1000 thru DN1031

Item	Part No.	Description	Qty.
	029-1422-00	Column Asembly (Includes Items 1 thru 20)	1
1	• 030-0778-10	• Outer Slide Weldment	1
2	• 030-0779-10	• Middle Slide Weldment	1
3	• 030-0780-10	• Inner Slide Weldment	1
4	• 029-1423-00	• Straight Tire / Bearing Assembly	8
5	• 029-1424-00	• Eccentric Tire / Bearing Asembly	8
6	• 029-1425-00	• Straight Bearing Assembly	6
7	• 029-1426-00	• Eccentric Bearing Assembly	6
8	• 042-0109-00	• Screw	36
9	• 051-0682-00	• 45° Chain End	2
10	• 042-0101-02	• External Retaining Ring	4
11	• 016-0454-00	• Leaf Chain	2
12	• 057-0322-00	• Chain Pin	4
13	• 051-0681-00	• Straight Chain End	1
14	• 040-0375-31	• Screw	2
15	• 057-0304-00	• Sprocket Hub	2
16	• 016-0149-00	• Bearing	2
17	• 057-0323-00	• Chain Roller	2
18	• 016-0452-00	• Gas Spring	1
19	• 042-0014-23	• Shoulder Screw	2
20	• 051-0720-00	• Drawbolt Chain End	1
21	061-0045-00	Caution Label	2

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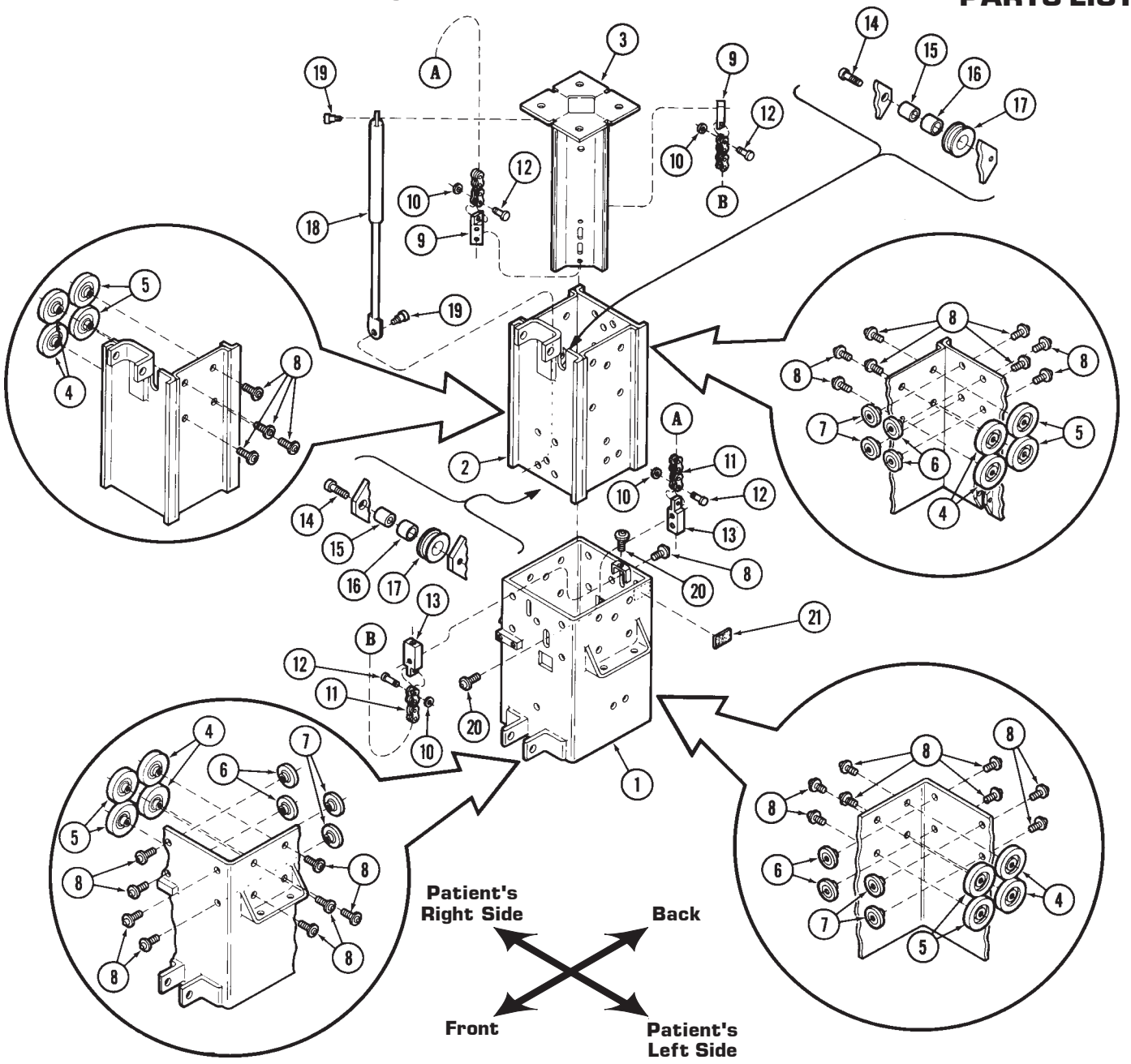
Column Assembly



MA2104-01

Used on units with Serial Number DN1032 thru Present

Item	Part No.	Description	Qty.
	029-1422-00	Column Asembly (Includes Items 1 thru 20)	1
1	• 030-0850-10	• Outer Slide Weldment	1
2	• 030-0779-10	• Middle Slide Weldment	1
3	• 030-0780-10	• Inner Slide Weldment	1
4	• 029-1423-00	• Straight Tire / Bearing Assembly	8
5	• 029-1424-00	• Eccentric Tire / Bearing Asembly	8
6	• 029-1425-00	• Straight Bearing Assembly	6
7	• 029-1426-00	• Eccentric Bearing Assembly	6
8	• 042-0109-00	• Screw	32
9	• 051-0682-00	• 45° Chain End	2
10	• 042-0101-02	• External Retaining Ring	4
11	• 016-0454-00	• Leaf Chain	2
12	• 057-0322-00	• Chain Pin	4
13	• 051-0720-00	• Drawbolt Chain End	2
14	• 040-0375-31	• Screw	2
15	• 057-0304-00	• Sprocket Hub	2
16	• 016-0149-00	• Bearing	2
17	• 057-0323-00	• Chain Roller	2
18	• 016-0452-00	• Gas Spring	1
19	• 042-0014-23	• Shoulder Screw	2
20	• 042-0312-24	• Drawbolt / Chain End Screw (Apply Loctite Adhesive 042-0024-00	4
21	061-0045-00	Caution Label	2

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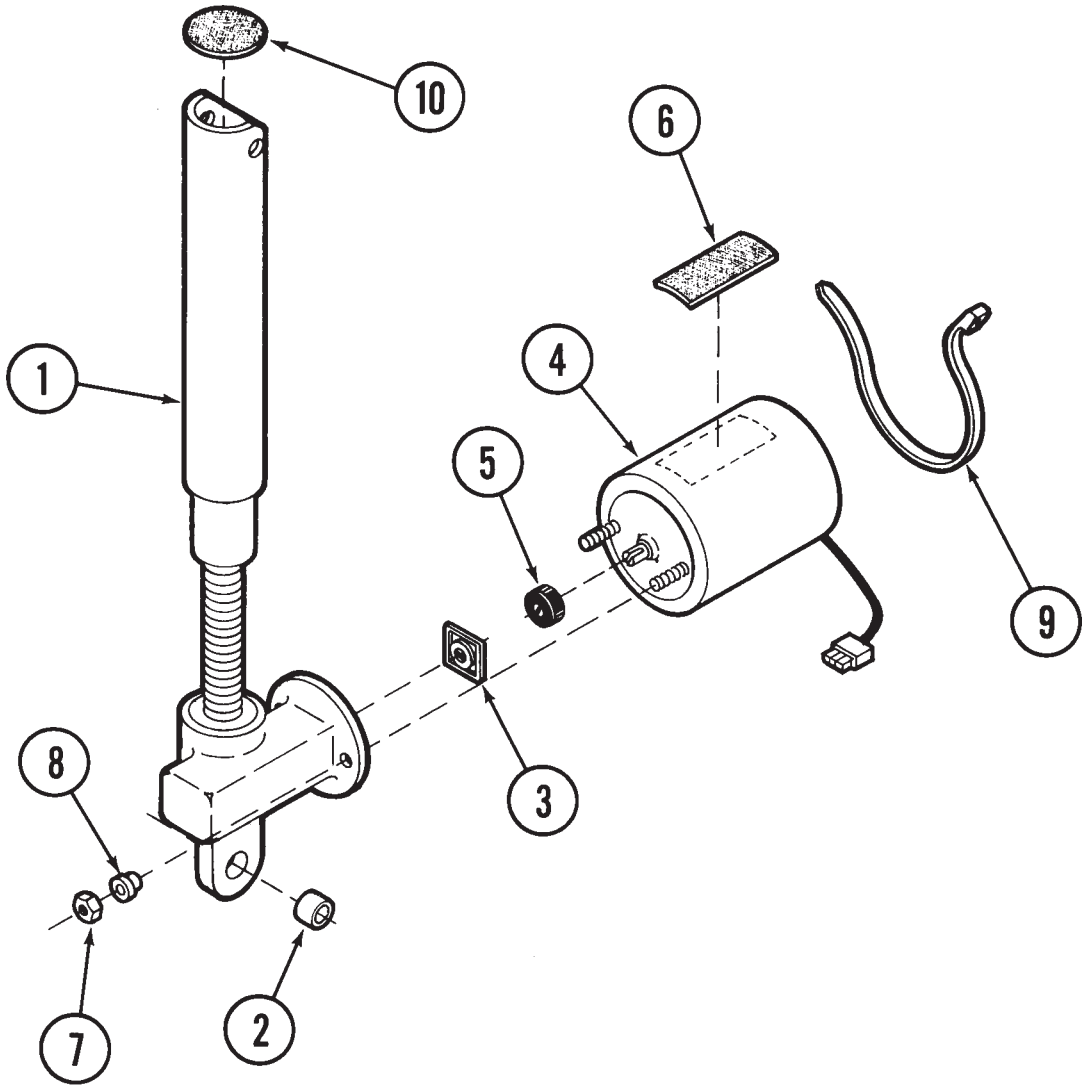
Base Actuator Assembly



MA2116

Used on units with Serial Number DN1000 thru DN1012

Item	Part No.	Description	Qty.
	002-0382-03	Base Actuator Assembly (Includes Items 1 thru 9)	1
1	• 002-0382-04	• Actuator Mechanism (Includes Item 2 and 3)	1
2	• •	• • Bushing	1
3	• • 016-0237-00	• • Actuator Brake	1
4	• 002-0382-02	• Motor Assembly (Includes Items 5 and 6	1
5	• • 016-0509-00	• • Motor Coupler	1
6	• • 061-0135-00	• • Caution Label	1
7	•	• Nut	2
8	• 053-0198-00	• Shoulder Washer	2
9	• 015-0013-01	• Cable Tie	1
10	• 053-0131-28	• Velcro Cap	1

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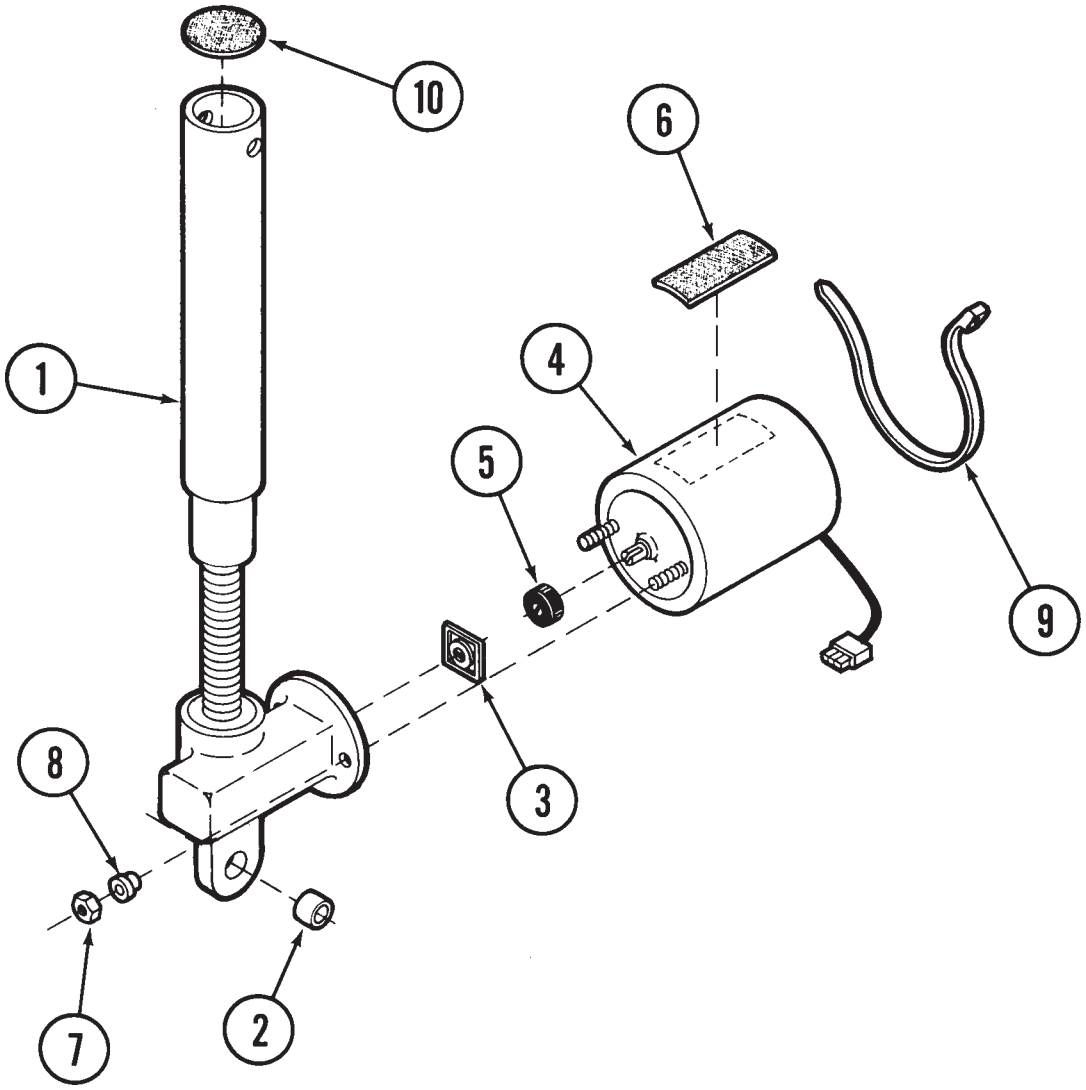
Base Actuator Assembly



MA2116

Used on units with Serial Number DN1013 thru Present

Item	Part No.	Description	Qty.
	002-0382-00	Base Actuator Assembly (Includes Items 1 thru 9)	1
1	• 002-0382-01	• Actuator Mechanism (Includes Item 2 and 3)	1
2	• •	• • Bushing	1
3	• • 016-0237-00	• • Actuator Brake	1
4	• 002-0382-02	• Motor Assembly (Includes Items 5 and 6	1
5	• • 016-0509-00	• • Motor Coupler	1
6	• • 061-0135-00	• • Caution Label	1
7	•	• Nut	2
8	• 053-0198-00	• Shoulder Washer	2
9	• 015-0013-01	• Cable Tie	1
10	• 053-0131-28	• Velcro Cap	1

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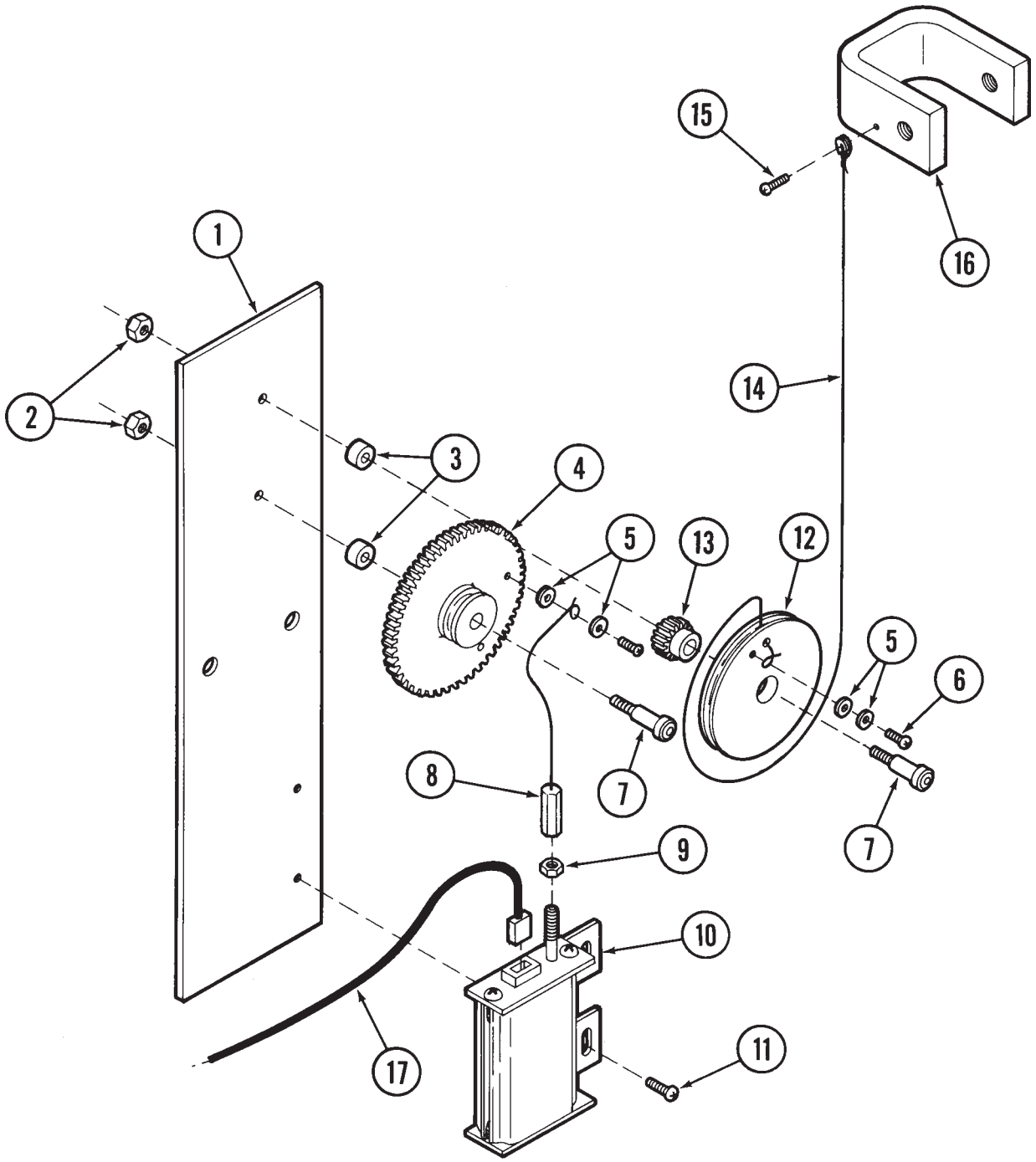
Base Reducer Assembly



MA2112

Item	Part No.	Description	Qty.
	029-1507-00	Base Reducer Assembly (Includes Items 1 thru 14)	1
1	• 050-2280-00	• Base Reducer Plate	1
2	• 041-0010-00	• Nut	2
3	• 053-0110-07	• Nylon Spacer	2
4	• 016-0482-00	• Base Output Gear	1
5	• 045-0001-50	• Washer	4
6	• 040-0006-12	• Screw	2
7	• 042-0014-22	• Shoulder Screw	2
8	• 029-1512-00	• Cable / Turnbuckle Assembly	1
9	• 041-0008-01	• Nut	1
10	• 015-0715-00	• Linear Transducer	1
11	• 040-0010-47	• Screw	2
12	• 057-0346-00	• Base Capstan	1
13	• 016-0483-00	• Reducer Pinion	1
14	• 029-1513-00	• Cable Assembly	1
15	040-0008-08	Screw	1
16		Middle Slide Weldment (Refer to Column Assembly Breakdown)	Ref
17		Transducer Harness (Refer to Wiring Diagram Elsewhere)	Ref

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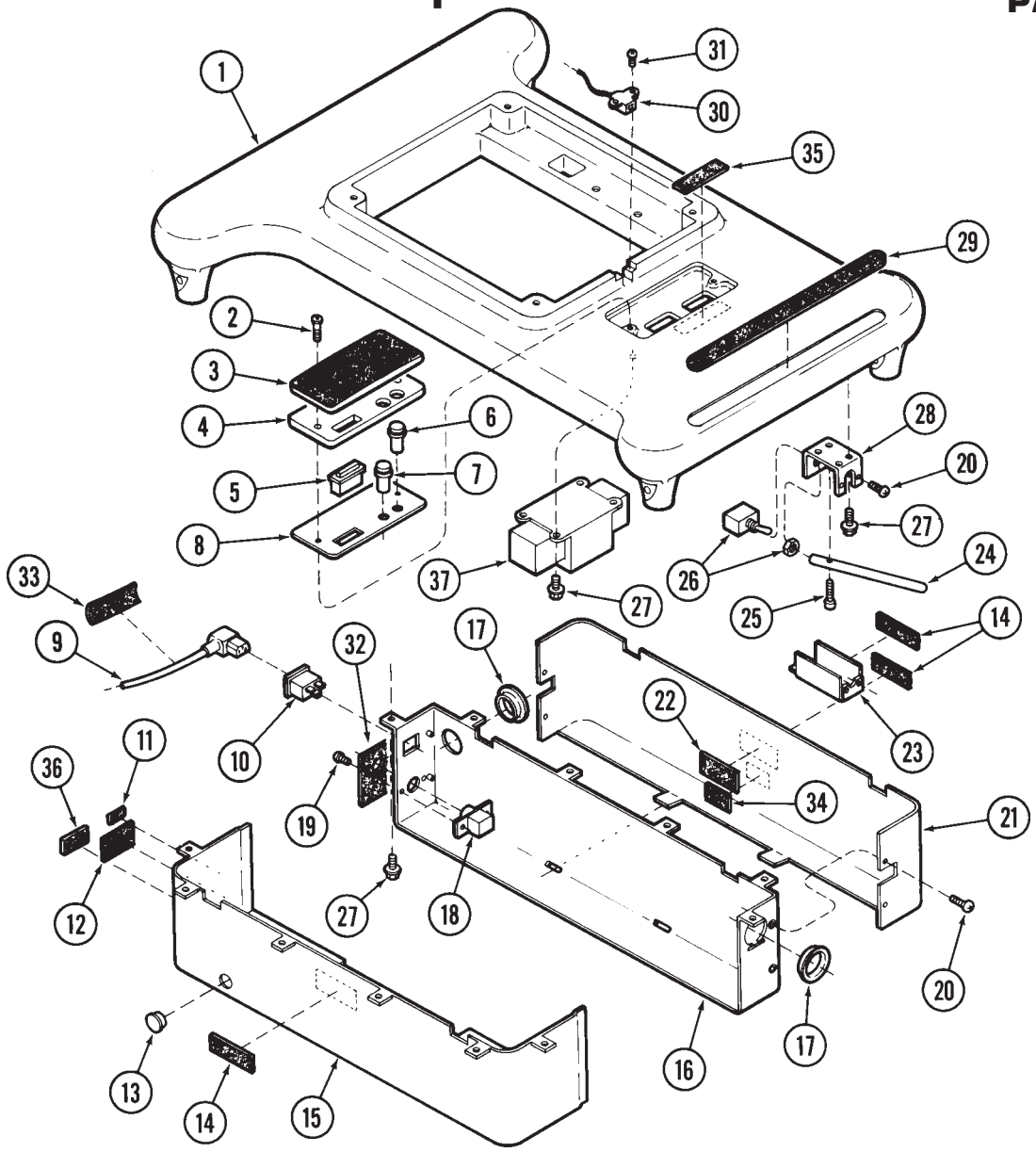
Base Electrical Components



MA2110

Item	Part No.	Description	Qty.
1		Base Casting (Refer to Brake Components Breakdown)	Ref
2	042-0059-01	Joint Connector Bolt	2
3	053-0467-00	Name Plate	1
4	054-0169-00	Light Gasket	1
5	015-0742-00	Rectangular Light-Green	1
6	015-0743-00	Round Light-Green	1
7	015-0743-01	Round Light-Amber	1
8	050-2149-00	Light Bracket	1
9	015-0776-00	Cordset (Domestic Units Only)	1
10	015-0639-00	A.C. Connector Receptacle	1
11	061-0474-00	Patent Label -712	1
12		Serial Number Label	1
13	053-0050-00	Hole Plug	1
14	061-0033-00	Caution Label-(Shock)	3
15	050-2136-10	Outer Shroud	1
16		Electrical Panel (See Elsewhere)	Ref
17	053-0068-05	Snap Bushing	2
18	015-0738-00	Manual Override Button	1
19	040-0006-09	Screw	2
20	040-0010-47	Screw	6
21	050-2134-10	Electrical Cover	1
22	061-0424-00	Transducer Readings Label	1
23	050-2137-10	Switch Cover	1
24	057-0325-00	Switch Lever	1
25	042-0014-22	Shoulder Screw	1
26	015-0739-00	Toggle Switch	1
27	040-0250-88	Screw	18
28	030-0787-10	Switch Bracket Weldment	1
29	061-0387-00	Brake / Power Label	1
30	015-0772-00	Modular Harness	1
31	040-0006-09	Screw	2
32	061-0393-00	Manual Override Label	1
33	061-0034-00	Cord Tag (Domestic Units Only)	1
34	061-0420-00	Fuse Label	1
35	061-0392-00	Load Limit Label	1
36	061-0052-00	U.L. Listing Label	1
37	015-0826-00	Transformer (Export Units Only)	1

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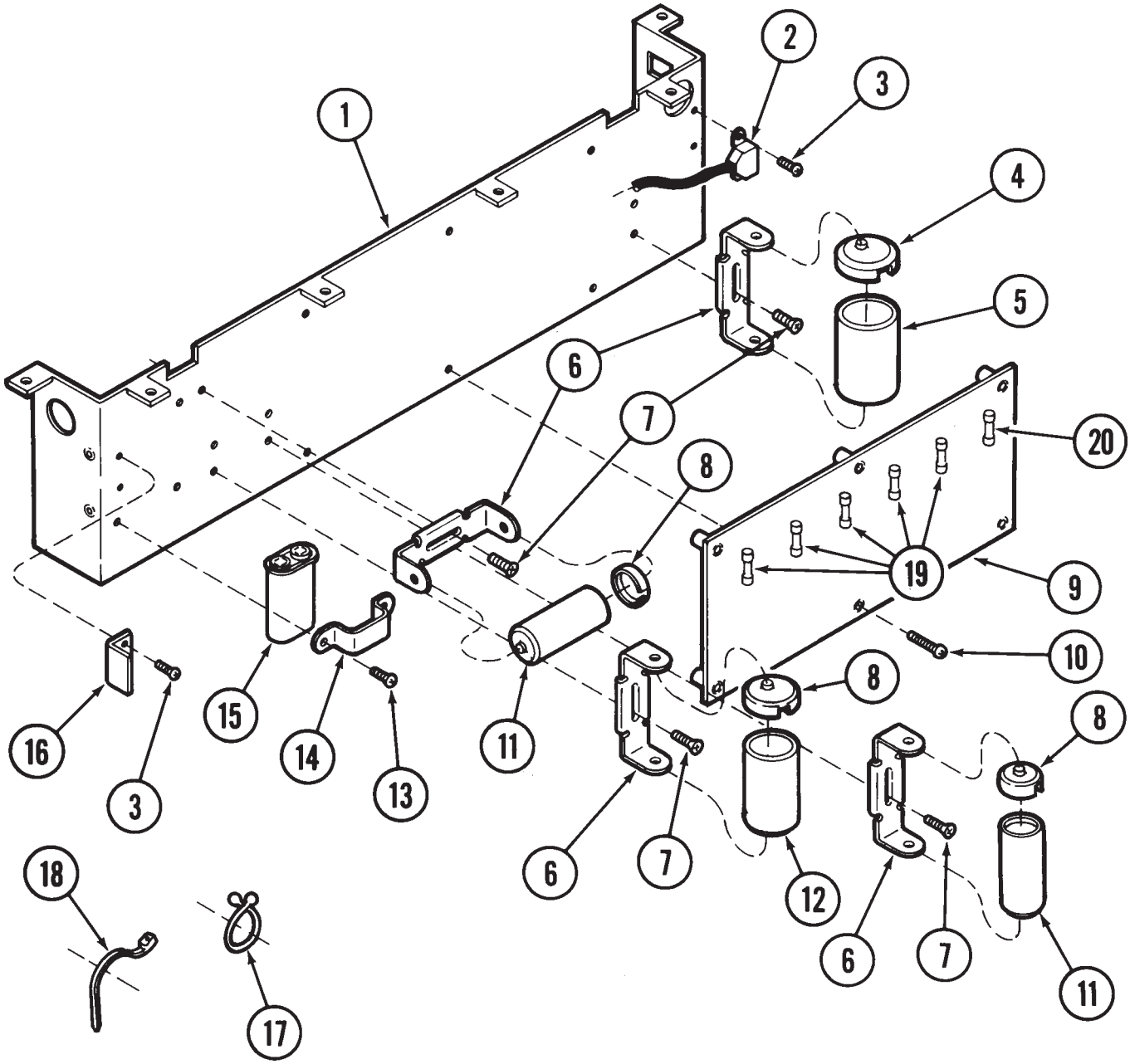
Electrical Panel



MA2111

Item	Part No.	Description	Qty.
1	002-0388-00	Inner Shroud	1
2		Modular Harness (Refer to Wiring Diagram Elsewhere)	Ref
3	040-0006-09	Screw	4
4	015-0413-01	Capacitor Cap	1
5	015-0437-00	Capacitor	1
6	015-0412-00	Capacitor Mounting Bracket	4
7	040-0010-62	Screw	8
8	015-0413-00	Capacitor Cap	3
9	002-0442-00	PC Board (Includes Items 19 & 20)	1
10	040-0006-55	Screw	6
11	015-0437-04	Capacitor	2
12	015-0437-02	Capacitor	1
13	040-0010-47	Screw	2
14	015-0724-00	Oval Capacitor Bracket	1
15	015-0723-01	Capacitor	1
16	050-2325-10	Modular Receptacle Cover	1
17	016-0488-00	Twist Lock	2
18	015-0013-02	Cable Tie	1
19	015-0346-03	Fuse (5 amp)	5
20	015-0346-10	Fuse (1/4 amp)	1

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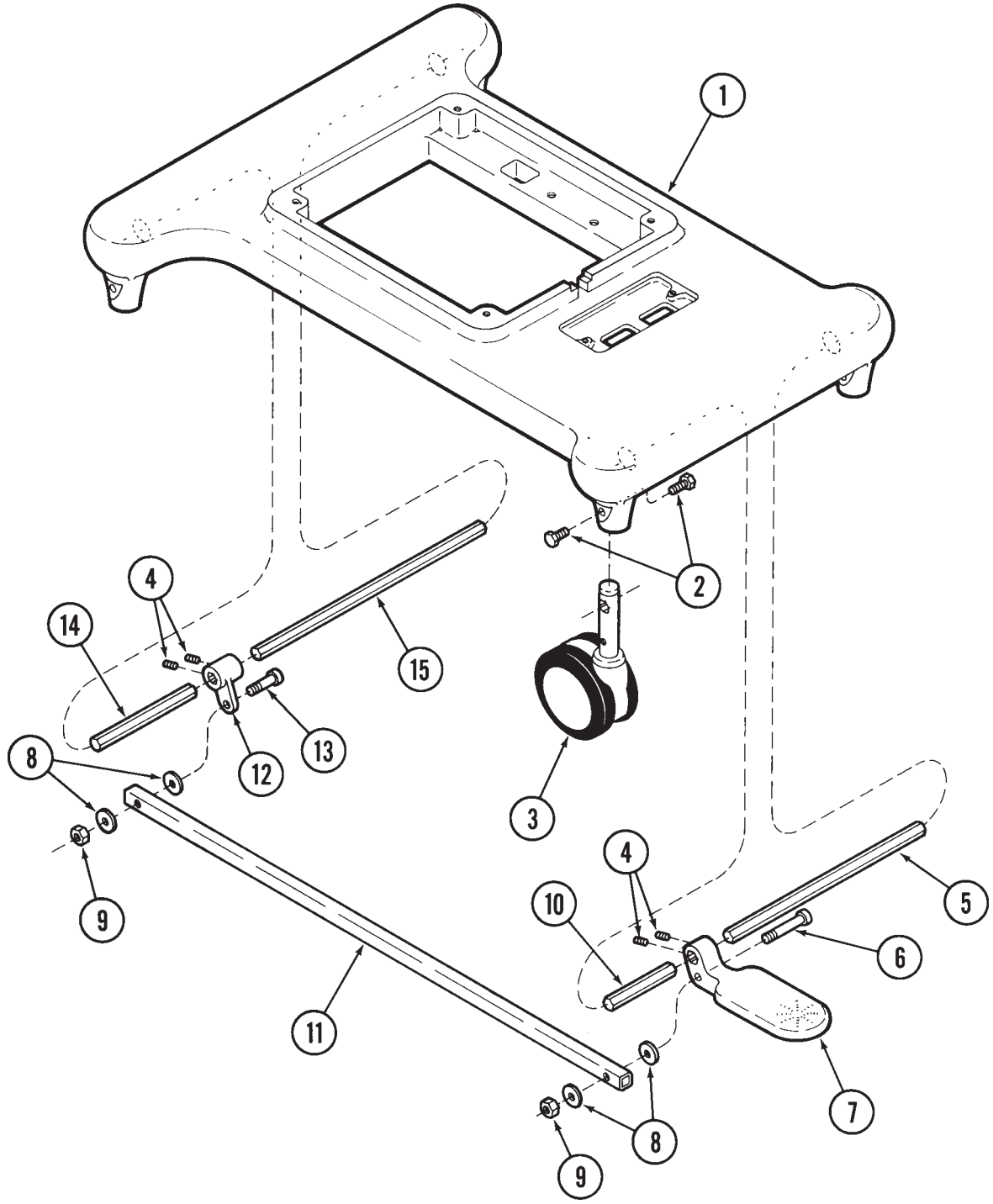
Brake Components



MA2109

Item	Part No.	Description	Qty.	Item	Part No.	Description	Qty.
1	020-0126-10	Base Casting	1	8	K902583-1	Fiber Washer	4
2	042-0081-02	Screw	8	9	041-0312-01	Nut	2
3	016-0457-00	Caster (Domestic Units)	4	10	051-0692-06	Brake Actuator Bar	1
	016-0457-01	Caster (Export Units)	4	11	052-0190-10	Throw Rod	1
4	040-0250-04	Set Screw	4	12	030-0786-00	Connecting Lever Weldment	1
5	051-0692-04	Brake Actuator Bar	1	13	042-0014-32	Shoulder Screw	1
6	042-0014-33	Shoulder Screw	1	14	051-0692-02	Brake Actuator Bar	1
7	020-0127-10	Brake Pedal	1	15	051-0692-00	Brake Actuator Bar	1

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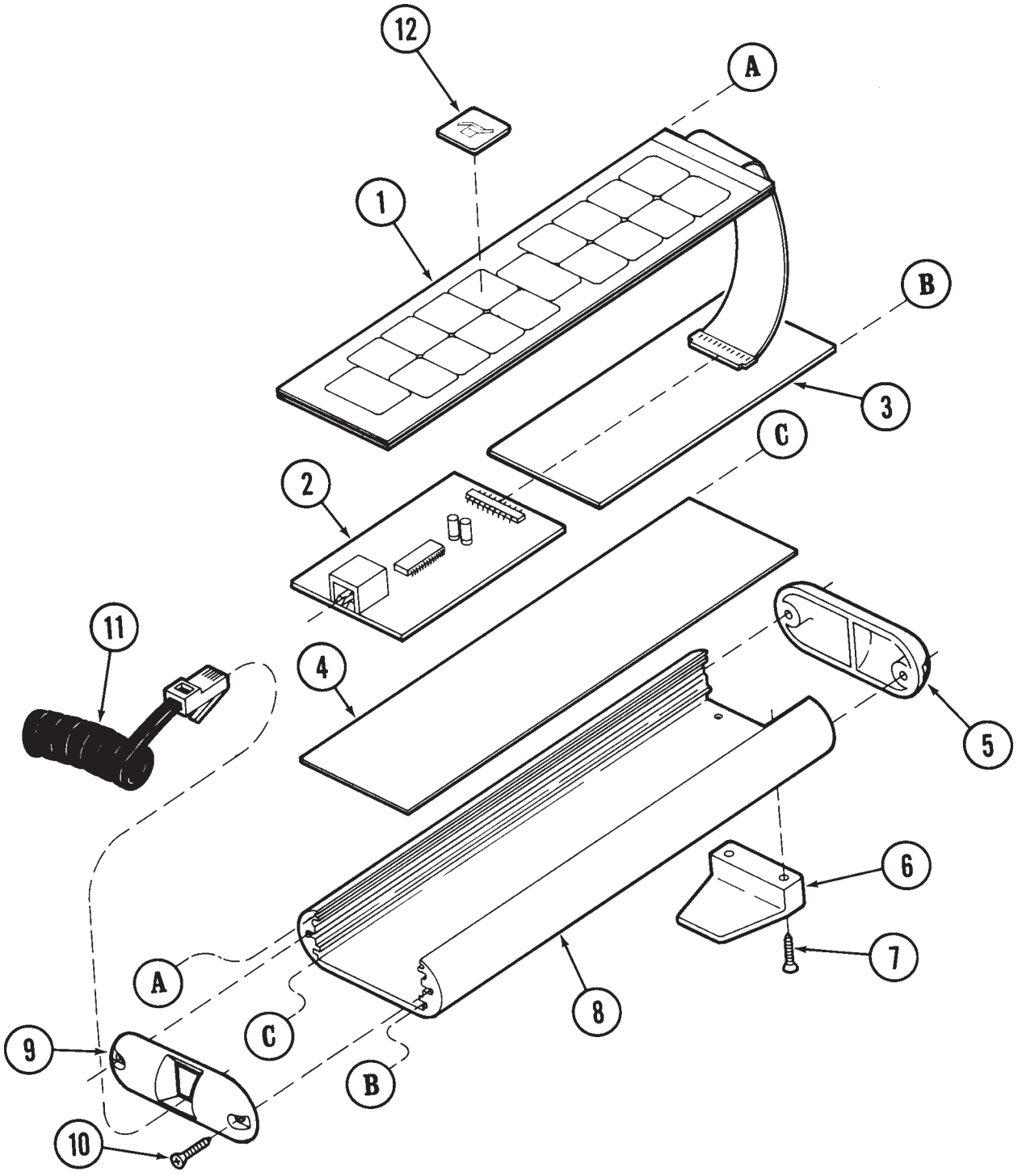
Hand Control Assembly



MA2113

Item	Part No.	Description	Qty.	Item	Part No.	Description	Qty.
	029-1494-00	Hand Control Assembly (Includes Items 1 thru 12)	1	6	• 053-0478-00	• Hand Control Hook	1
1	• 015-0719-00	• Hand Control Panel	1	7	• 040-0008-43	• Screw	2
2	• 015-0714-00	• Control Interface Board	1	8	• 021-0016-02	• Hand Control Tube	1
3	• 053-0253-02	• Locating Plate	1	9	• 053-0256-00	• Bottom End Cap	1
4	• 053-0092-06	• Insulator- Fishpaper	1	10	• 040-0006-08	• Screw	4
5	• 053-0257-00	• Top End Cap	1	11	• 015-0765-01	• Modular Coil Cord	1
				12	• 061-0402-00	• Pictorial Sheet (Button Icons)	2

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SECTION VI
PARTS LIST

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FAX ORDERING FORM

(SERVICE PARTS ONLY)

NOTES:

- **ALL BLOCKED AREAS MUST BE COMPLETED.**
- **USE FOR NON-WARRANTY FAX ORDERS ONLY. WARRANTY ORDERS MUST BE TELEPHONED IN (1-800-MIDMARK).**

ATTENTION: SERVICE DEPARTMENT FAX#: 877-249-1793

ACCT #: _____ **P.O. #:** _____ **DATE:** _____

NAME: _____ **SHIP TO:** _____

ADDRESS: _____

CITY, ST.: _____

CONTACT: _____

PHONE: _____

☐ **NON-EMERGENCY ORDER - TO SHIP WITHIN 72 HOURS IF PART(S) IN STOCK.**

☐ **EMERGENCY ORDER - TO SHIP WITHIN 24 HOURS IF PART(S) IN STOCK (IF ORDER IS RECEIVED BEFORE 1:30 P.M. E.S.T).**

SEND NOTIFICATION IF PARTS ARE NOT AVAILABLE TO SHIP WITHIN 24 HOURS VIA E-MAIL OR FAX TO: _____

METHOD OF SHIPMENT

UPS	FED EX
☐ NEXT DAY A.M.	☐ NEXT DAY A.M.
☐ NEXT DAY P.M.	☐ NEXT DAY P.M.
☐ 2ND DAY	☐ 2ND DAY
☐ GROUND	☐ ECONOMY

OTHER _____

QTY.	PART #	DESCRIPTION (SPECIFY COLOR OF ITEM IF APPLICABLE)	COLOR CODE	PRICE/PER

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P.O. Box 286
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